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100

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Switching and the Virtual LAN

Effective Deployment & Management Strategies

DIRECTED AND TAUGHT BY JOHN MCCONNELL

Switching is revolutionizing the way we deliver desktop bandwidth.

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- Explore the basic features and functions for each type of switching product: know what you MUST have for each product
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Switching and the Virtual LAN Dates/Cities	
Boston, MA	September 24
New York, NY	September 25
Philadelphia, PA	September 27
Dallas, TX	October 8
Atlanta, GA	October 9
Chicago, IL	October 11
Washington, DC	November 15
Irvine, CA	February 10
San Francisco, CA	February 11
Seattle, WA	February 13

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Intranets are not the latest buzzword or craze in the IT industry. They are real, already in place in more than one-fifth of all Fortune 500 companies and are transforming the way business and IT professionals think about information access, distribution and network infrastructures. This seminar will explore intranets from their high-level architectures to their lower-level technologies. Join thousands of your colleagues who have taken this course and who are developing successful intranets today!

Key Topics You Don't Want to Miss!

- Learn the methods of integrating data sources including legacy systems
- Understand information publishing at the external, corporate, group, and personal levels
- Explore the future of intranets including Java, Active X, and Virtual Reality Modeling Language
- Develop an understanding and strategy for intranet security
- Learn the direction of intranet-based groupware

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DAY 1 SEMINAR:

Intranets: Technologies, Tools and Strategies Dates/Cities	
Boston, MA	October 21
New York, NY	October 24
Chicago, IL	November 6
Wash., DC	December 2
Atlanta, GA	December 5
San Francisco, CA	December 10
Morristown, NJ	January 21
Philadelphia, PA	January 23
Irvine, CA	February 11
Dallas, TX	February 18

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The Key Technologies of Intranets

In great technical depth, this seminar will focus on solutions for intranet security, connectivity and management. In the security section you will explore the implications of defending your most valuable corporate asset: Information. The connectivity section will focus on the challenge of achieving maximum utility via the integration of legacy systems and existing corporate databases. Concluding with management, the core tools of intranet development and management will be closely examined. Don't miss out on this high-demand program! Invest a day at this seminar to optimize your company's secure and cost-effective intranet.

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- Examine the foundations of your intranet security strategy
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- Analyze the role of firewalls and proxy servers
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DAY 2 SEMINAR:

Intranets: Security, Connectivity & Management Dates/Cities	
Boston, MA	October 22
New York, NY	October 25
Chicago, IL	November 7
Wash., DC	December 3
Atlanta, GA	December 6
San Francisco, CA	December 11
Morristown, NJ	January 22
Philadelphia, PA	January 24
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SEPTEMBER 23, 1996 VOLUME 13, NUMBER 39

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Stamping out E-mail security problems

The U.S. Postal Service thinks it has a fix. Page 14.

Salaries are on the rise

Strong demand for networking skills means you can make more money, but you'll have to work even harder to keep your staff happy.

NetworkWorld
Deloitte & Touche Consulting
Salary Survey

A few months ago, CJ Cummings quit her job at a New York publishing firm where she was a systems analyst dealing mostly with Internet issues.

She left to take a similar position on a contract basis with AT&T's telecommunications division.

The reason? She was offered twice her former salary.

When contracting firm 3D Information Services, Inc. came knocking with the AT&T job offer, it looked like a sweet deal even if it meant giving up the security of a full-time position. Technically, she's only on board at AT&T for six months, but renewals aren't exactly uncommon. And she still receives benefits, including health care and transportation reimbursement.

See Salaries, *page 52*

Playing catch-up, Microsoft demos its directory future

NETWORLD+INTEROP 96 10th ANNIVERSARY

By Christine Burns
Atlanta

Microsoft Corp. detractors have long bashed the giant as a company without a directory. Attempting to defuse that criticism, Microsoft last week demonstrated a directory tool it plans to ship in just over a year.

The company gave a glimpse of its next-generation hierarchical directory tree and previewed a management utility, code-named Slate, that will provide centralized directory and user administration. The demonstration was part of a presentation by Jim Allchin, senior vice president of Microsoft's Desktop and Business Systems Division, at the NetWorld+Interop 96 conference here.

It's about time Microsoft showed off directory wares that go beyond its limited domain-based service, given that its competitors are rapidly rolling out directory offerings for NT networks and widely advertising Microsoft's shortcomings in this

See **Microsoft**, *page 72*

MARK ESCHER

Microsoft's *Allchin lays out NT directory path.*

WHAT HAPPENED TO CAIRO?

Microsoft has opted away from its original approach to delivering Cairo — the next major revision of Windows NT — all at once. Instead, the company will release individual components as they are developed.

Cairo features:

Windows NT 4.0	Currently in beta	Expected In NT 5.0
▶ Windows 95 user interface	▶ Distributed File System	▶ File system supporting richer indexing capabilities
▶ Distributed Common Object Model		▶ Advanced directory services and security management
▶ Full content and properties indexing		

Roller hockey, junk food and futons: Growing up Netscape-style

By Carol Sliwa

Working for one of the fastest growing start-ups in high-tech history can be tough, fun and a little crazy — all at the same time. Just talk to Netscape's roller hockey team.

EDWARD CALDWELL

Netscape's *Treuhaft, Paquin and Sands (left to right) still on the move.*

These guys found a terrific place to work out, but the company needed the space for more cubicles. Ever the resourceful ones, they went and located another area. But again, the company needed the space. So they grabbed an empty parking lot — but wait a minute, the company said it needed it for new employees' cars.

Such is the life of a Netscape employee. On the one hand, employees are excited to work for a company that is growing so fast. But on the other, they are confronted with a series of daily challenges, some more difficult

See **Netscape**, *page 73*

Barksdale tells Netscape critics to 'get a life'

MARK ESCHER

Netscape *chief shoots straight.*

Q&A

As president and CEO of Netscape Communications Corp., Jim Barksdale is leading the company in its battle vs. Microsoft Corp. and a host of other competitors, large and small. A battle-hardened Barksdale met up with *Network World* at NetWorld+Interop 96 for this interview.

Do you think Microsoft really wants to kill Netscape?

I don't know what they believe. They've made statements in public. They try to get people to chant with them to kill Netscape — including at a CIO

See **Barksdale**, *page 72*

Cabletron's big ATM boost

NETWORLD+INTEROP 96 10th ANNIVERSARY

By Jodi Cohen
Atlanta

Cabletron Systems, Inc. apparently is not satisfied with the performance of its current high-end ATM switch. So at NetWorld+Interop 96 last week, the company gave attendees a sneak peek at a soon-to-be-announced backbone switch that offers as much as 75G bit/sec of switching capacity — more than seven times that of its existing high-end ATM offering.

Although the company would be happy to sell the backbone switch to new customers, the easiest sell is probably to the Cabletron installed base. That is because the device, code-named SmartCell, is actually a module

See **Cabletron**, *page 72*

Read articles about previous Cabletron moves in the switching market. Enter the number to the right in the DocFinder box on the home page.

FIND IT ON FUSION 9310

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Internet health report Part Two

Even with quick fixes in place, 'Net traffic jams lay ahead. See what the ISPs have up their sleeves for long-term solutions and what you can do in the meantime. Page 67.

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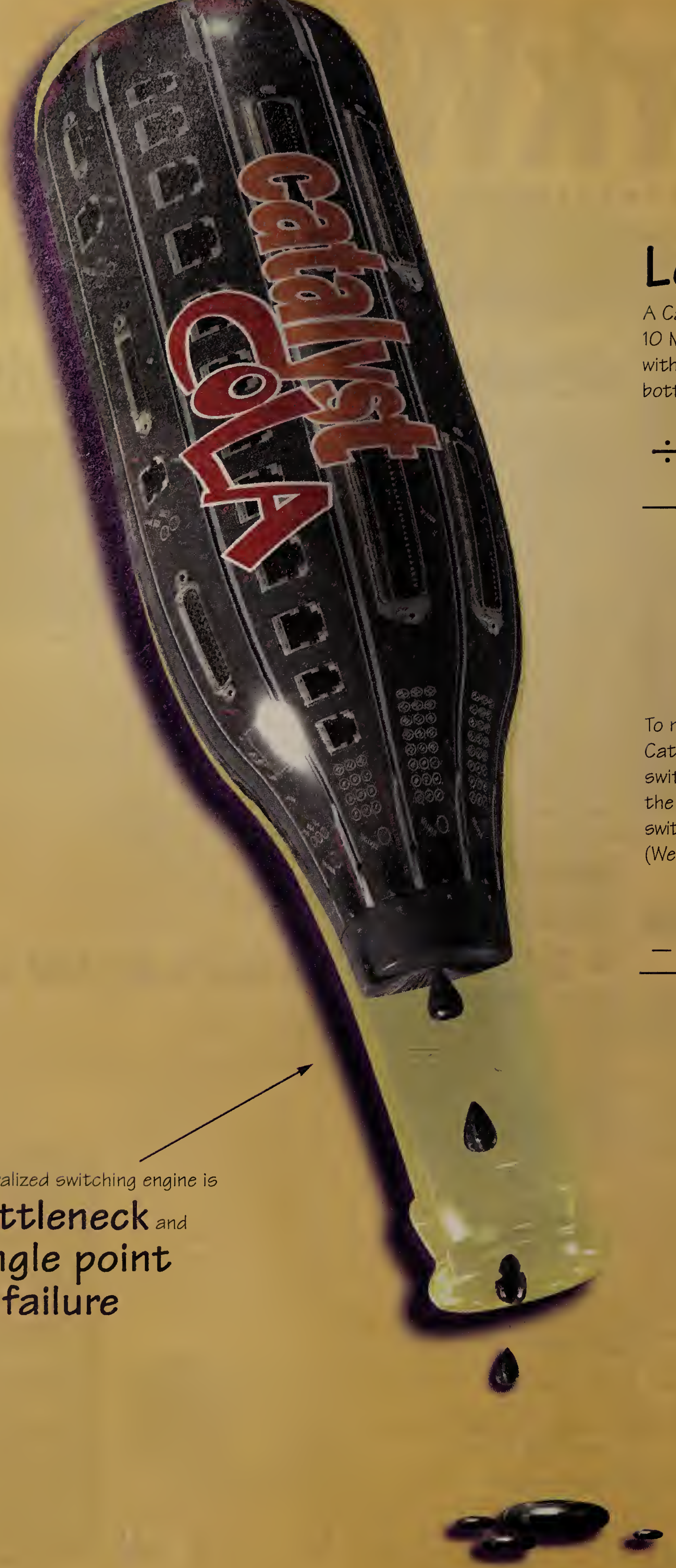

Centralized switching engine is **bottleneck** and **single point of failure**

Let's do the math:

A Catalyst 5000 with 96 switched Ethernet ports at 10 Mbps equals 960 Mbps of downlink traffic. And with only two 100 Mbps Fast Ethernet uplinks, your bottleneck has been created.

÷ 200 Mbps uplinks to backbone
960 Mbps downlinks to desktop

uplinks can only handle
21% of total throughput

To make matters worse, Cisco is selling the Catalyst 5000 as a 50-port Fast Ethernet switch. At 100 Mbps per port, that's 5 Gbps. But the total capacity of the Catalyst's centralized switching engine is only 1.2 Gbps. You're oversubscribed! (We'll let you do the math for Gigabit Ethernet.)

5 Gbps
− 1.2 Gbps
3.8 Gbps

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Sorry Cisco,

but we *thought* the idea of switching was to *remove* the *bottlenecks*

The Catalyst 5000 may be an okay Ethernet switch. But running traffic from all 96 switched Ethernet ports (960 Mbps) out the two built-in Fast Ethernet uplinks (200 Mbps) creates a significant bottleneck in your network. Then what? Add one of Cisco's 12-port Fast Ethernet uplink modules for 1.2 gigs of raw switching power? Fine, except the total capacity of the Catalyst's centralized controller module is only 1.2 gigs. You're oversubscribed. And to make matters worse, that centralized controller in the Catalyst 5000 is a single point of failure!

Fortunately, there's a more reliable way to eliminate bottlenecks: the fully distributed, fault-tolerant MMAC-Plus from Cabletron Systems. With the MMAC-Plus, every module has its own switching engine and management processor. So the more modules you add, the more bandwidth and throughput you get. All with no single point of failure.

Now that's the idea of switching... eliminate the bottlenecks.

The Facts Speak for Themselves

PERFORMANCE	CABLETRON'S MMAC-PLUS	CATALYST 5000
Backplane	2.5 Gbps (scalable to > 300 Gbps)	1.2 Gbps (fixed)
Aggregate Bandwidth	10 Gbps (scalable to > 75 Gbps)	1.2 Gbps
Throughput	10.5M pps (scalable to > 100M pps)	1M pps

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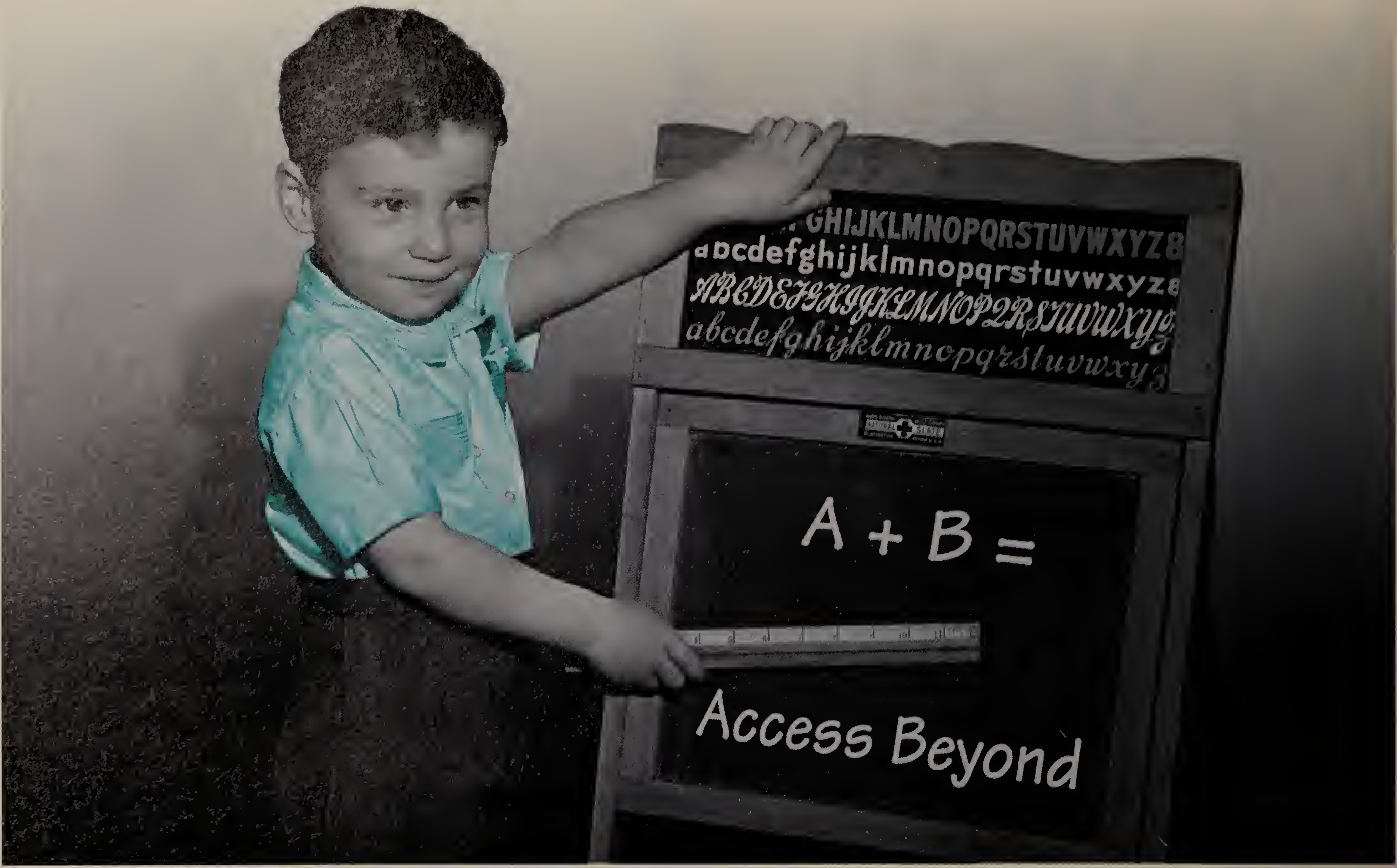

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This Week

News+

- **Salary survey:** Read an interview with Deloitte & Touche officials about the results of the annual Network World/Deloitte & Touche survey, a detailed breakdown by job category and advice from professional recruiters. **DocFinder: 9304.**
- **Backbones:** Read articles about previous moves by Cabletron in the ATM backbone switching market. **DocFinder: 9310.**
- **The Internet:** Review the first of a two-part story investigating the health of the Internet, and read articles about ATM and quality of service. **DocFinder: 9309.**
- **LAN switching:** Check out an introduction to switched Ethernets, an overview of IOS software and details about Compaq's Netelligent networking software. **DocFinder: 9303.**
- **Netscape:** Read the complete transcript of the Network World interview with Netscape CEO Jim Barksdale. **DocFinder: 9308.**
- **Database tools:** Learn how other database vendors are linking their applications to the Web. **DocFinder: 9305.**
- **Online publishing:** Investigate links to scores of online newspapers and the home page of Digital Ink's Mike George. **DocFinder: 9301.**

NetRef

- **Servers:** Download detailed test results for the latest servers from Data General and The Panda Project, as well as our July review of the AViiON AV 4900. **DocFinder: 9306.**

Careers

- **Career advice:** Look for more tips on job hunting from networking industry placement pro Frank Schoff. **DocFinder: 9307.**

HOW TO GET ON TO NETWORK WORLD FUSION

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NetworkWorld Fusion
CONFERENCE PICK

Read Daniel Briere and Christine Heckart's column on ATM's short-lived standards (page 30), then add your opinion online. Select Forum, Columnists, then WAN Monitor.

NetworkWorld
An IDG Publication

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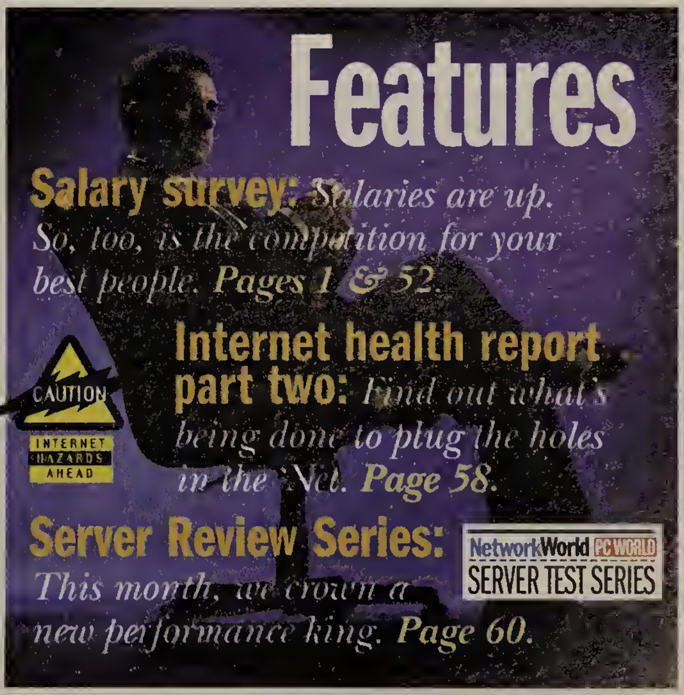

Features

Salary survey: *Salaries are up. So, too, is the competition for your best people. Pages 1 & 52.*
Internet health report part two: *Find out what's being done to plug the holes in the 'Net. Page 58.*
Server Review Series: *This month, we crown a new performance king. Page 60.*

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Editorial and advertiser Indexes. *Page 71.*

NetworkWorld's *Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.*

News briefs, September 23, 1996

■ Interop: Spending quality of service time together

FORE Systems, Inc., Ipsilon Networks, Inc. and Sprint Corp. last week at NetWorld+Interop 96 announced plans to extend the IP switching protocol, the General Switch Management Protocol, to support quality of service. Right now, IP switching does not support different priority levels. The companies will submit the new specification to the Internet Engineering Task Force. It is expected to be finished in the first quarter of 1997, the same time frame for completion of the competing Multi-Protocol over ATM implementation.

■ Interop: Sun and Apple get in sync

Sun Microsystems, Inc. and Apple Computer, Inc. last week unveiled a network and multimedia alliance aimed at boosting each other's fortunes in the intranet market. The companies plan to improve the interoperability between Solaris servers and Macintosh clients, officials said at NetWorld+Interop 96. In addition, the OpenDoc compound document architecture developed by Apple and IBM will be made interoperable with JavaBeans, Sun's model for building Java components, officials said. And, they added, Sun's JavaMedia will be integrated with Apple's QuickTime, so a Java applet on a Web page can run a QuickTime movie.

■ Interop: Now that's more manageable

Lotus Development Corp. last week announced plans to make its Notes groupware easier to manage by partnering with a host of management product vendors. The company will work with leading systems management vendors — including BMC Software, Inc., Cabletron Systems, Inc., Candle Corp. and Tivoli Systems, Inc. — to build tighter links between Notes and the companies' management platforms, Lotus officials said at NetWorld+Interop 96 last week. Lotus is building a collection of Java applets that will let Notes and Domino servers be managed from a Web browser.

■ Justice seeking Microsoft

The Department of Justice has launched an investigation into whether Microsoft Corp. is violating antitrust laws in the way it sells Internet software. The move is seen as part of a long-running government query into Microsoft's business pratices. Microsoft denied any wrongdoing in its battle vs. Netscape Communications Corp. and others in the Web browser and server markets.

■ Worldtalk gets in the middle

Worldtalk Corp., known for its tools that link disparate messaging systems, is moving into the groupware connectivity space, according to sources close to the company. Worldtalk is developing software to link Microsoft Corp.'s Exchange public folders, Lotus Development Corp.'s Notes databases and Internet news. Worldtalk officials are expected to talk up their plans at this week's Electronic Messaging Association Solutions Summit in San Jose, Calif.

■ Nokia puts networking in your hand

Nokia Corp. last week announced the PCS-1900 version of its Nokia 9000 Communicator, a wireless telephone and computer, at the PCS '96 show in San Francisco. The device runs on current Time Division Multiple Access technology in the personal communications services spectrum and is scheduled to ship in the second half of 1997. In addition to voice calls, the communicator lets users send and receive faxes, E-mail and short messages, as well as access Internet services and corporate and public databases, the company said.

■ Oracle's home videos

Oracle Corp. last week said it has developed a version of its Oracle video server for use by Internet service providers in their central points of presence to deliver streamed voice, data and images to users via a client software plug-in for the Microsoft Corp. or Netscape Communication's Corp. Web browsers. Mark Porter, vice president of Oracle's 'Net media products group, said the server delivers streamed content over 28.8K bit/sec modem lines, ISDN or 1.5M bit/sec Asymmetric Digital Subscriber Line modems.

For Novell, the future of NetWare is IntranetWare

By Christine Burns
Atlanta

Amid a flashy Broadway-style launch of its repackaged flagship product here last week, Novell, Inc. announced that customers will get all of the intranet products the company can muster for the same price as a NetWare 4.X server.

IntranetWare — pitched by Novell as the evolution of its NetWare line — includes NetWare 4.11, Web Server 2.5, an IPX/IP gateway, wide-area routing capabilities, File Transfer Protocol support, a scripting language called NetBasic and Netscape Communications Corp.'s Navigator browser.

IntranetWare will be generally available Oct. 7, ranging in price from $1,095 for a five-user license to $47,995 for a 1,000-user license.

Customers can upgrade from a NetWare 2.X, 3.X or 4.X server starting at $495 for a five-user license.

Customers are pleased with the prospect of getting a slew of intranet services for the same price as NetWare but are not convinced that IntranetWare is the obvious choice for them.

"It is a very complementary product suite," said Josh Turiel, director of information services at Adlife Co., a marketing and communications firm in Norwood, Mass. "But I don't think that [IntranetWare] is going to make as many inroads as Novell thinks it should because they just haven't convinced the industry that the basic NetWare engine is suitable for running your entire intranet."

Dan Blevans, a technical analyst with Hallmark, Inc. in Kansas City, Mo., said his company is running an intranet test bed comprising mostly Unix-based Web servers, despite the fact that the company runs a 60-server NetWare 4.X network.

"I'm in a wait-and-see mode" on IntranetWare, he said. "If Novell is going to throw in some useful Web services with IntraNetWare, I could see using them in one way or another because we like the [Novell Directory Services] administration tools. But overall, we are moving toward Unix for most of our Web capabilities."

Neil MacDonald, a senior analyst with Gartner Group, Inc.

See **IntranetWare,** ***page 12***

TOUGH TIMES AHEAD FOR NOVELL

In a recently published study titled "Novell At the Crossroads," Forrester Research revealed some startling numbers about future use of Novell's products at 50 large IT shops. Among the findings:

- While 90% of users surveyed have NetWare installed, only 20% have upgraded to NetWare 4.X.
- Only 48% of the respondents said they will still be using NetWare in three years.
- Just 16% of the interviewees are currently using Novell's other flagship products, ManageWise and GroupWise.
- About one-third of those interviewed said that Novell Directory Services play a roll in their enterprise strategy.
- When asked where Novell fits into their Internet/intranet plans, 72% of users surveyed said "Nowhere."

Novell exec beats his product out the door

Marengi announces corresponding executive shift, flattening of corporate structure.

By Christine Burns
Orem, Utah

Novell, Inc.'s IntraNetware was Steve Markman's baby. But Markman will not be lighting up any cigars when the product ships on Oct. 7.

Instead, the former Novell general manager will be learning about intelligent agents.

Three weeks after the resignation of Novell President and Chief Executive Officer Robert Frankenberg, Markman himself quit to become the CEO of General Magic, Inc., a troubled 6-year-old communications software firm located in Sunnyvale, Calif. General Magic had been founded to create system software for wireless devices but has been restructured to develop agent software for the Internet.

Novell's *Markman moves to General Magic as CEO.*

Markman, who was passed over for the Novell presidency in favor of Joe Marengi, former executive vice president of worldwide sales, had been responsible for all product engineering efforts since last January.

Novell announced the Markman move as part of an overall restructuring. Changes to the management team intended to flatten the overall structure and improve the lines of communication within the company, said company President Marengi.

As part of this effort, he also announced a group of eight executive and senior vice president positions that report directly to him. ■

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- Highest port density; lowest price per port.

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Ameritech reveals it will sleep with voice over frame enemy

By Timothy Greene
Atlanta

Avoiding the public telephone network by sending voice over the corporate frame relay network gained an unlikely fan last week: a phone company. Ameritech Corp. announced Voice Over Ameritech Frame Relay, a service that will be supported by customer premises equipment provided by Motorola, Inc.

IT'S FREE, BUT. . .

The Frame Relay Forum has raised some concerns in a white paper about sending voice over frame relay. They include:

- Loss of voice quality
- Lack of interoperability standards
- Lack of service provider guarantees

Frame Relay Forum Web site: www.frforum.com.

The new service lets users cut out some private-line costs by squeezing on-network voice traffic in with data on frame relay links.

That means users would likely shut off some of the private lines they now lease from Ameritech, but the carrier did not seem worried.

"To the extent that's cannibalizing our own business, we're OK with that," said Eric Hyde, Ameritech's director of data, voice and video marketing.

Ameritech claims it can afford the attrition. Sales of private leased lines have been increasing as users upgrade wide-area links from analog connections to dedicated digital connections, Hyde said.

The carrier will install and manage Motorola 6520 MPRouters, relieving users from having to install and service the gear themselves.

Ameritech is not making any commitments about the quality of the voice, which Hyde described as falling somewhere between toll-quality analog and cellular.

Other carriers have toyed with the idea of offering similar service, but none have committed to such an offering to date.

Testing the frame waters

At NetWorld+Interop last week, Sprint Corp. demonstrated voice over frame relay using Micom Corp.'s voice frame relay access devices (FRAD). Sprint acknowledged an interest in teaming up with an equipment vendor, but the company had no firm plans.

To create an effective system, carriers must consider single-vendor partnerships because most voice FRAD vendors develop their own technology and it commonly does not interoperate with equipment from another vendor.

That's a problem for users that might make an initial installation of devices from a single vendor but would like the flexibility to shop around on subsequent buys.

The Frame Relay Forum is working on a set of standards for interoperability of voice FRADs and frame relay services, but that work is not expected to be done until next year. ■

Nortel ATM switch add-on may displace carrier VPNs

Passport voice networking could save customers money.

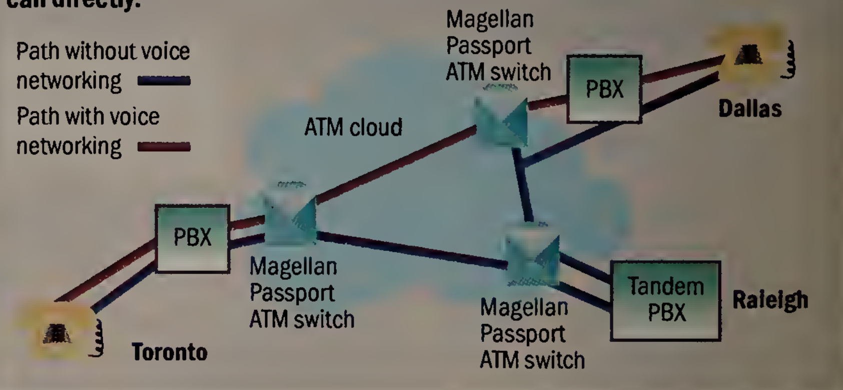
By David Rohde
Atlanta

Northern Telecom, Inc. last week debuted a feature of its flagship ATM backbone switch for creating a low-cost private voice network that could serve as an alternative to increasingly expensive virtual private network (VPN) services.

The voice networking software upgrade, introduced at NetWorld+Interop 96, will enable Nortel's Model 50 and 160 switches to understand PBX signaling protocols. As a result, the switches will be able to route on-net calls directly to another corporate site via voice-over-ATM technology and eliminate the need for either PBX tie lines or carrier VPNs.

NORTEL ADDS VOICE NETWORKING TO THE PASSPORT

In an existing environment, a voice call placed from Toronto to Dallas must leave the Magellan Passport ATM network and pass through a Tandem PBX, in, say, Raleigh, N.C. By using the Passport's voice networking feature, though, the switch can understand PBX signaling protocols and route the call directly.


Path without voice networking
Path with voice networking
Magellan Passport ATM switch
PBX
Dallas
ATM cloud
PBX
Magellan Passport ATM switch
Magellan Passport ATM switch
Tandem PBX
Raleigh
Toronto

A number of ATM switches, including the Magellan Passport, already have the capability of taking voice streams off the PBX and feeding it to a private ATM cloud. But in most cases, a call from one company location to another must leave the Passport network and pick up routing instructions from a big tandem PBX before reentering the ATM cloud.

Nortel officials conceded that Passport voice networking is only capable of displacing the on-net portion of popular carrier VPNs such as AT&T's Software Defined Network. Customers would have to continue to rely on those services for on-net to off-net calls, they said.

Still, they said this could be easily accomplished via PBX routing tables or employee instructions, such as dialing "6" for on-net calls and "9" for outside calls.

And the fully loaded cost of sending on-net calls using the new voice networking technology would be about half a cent per minute, whereas it typically costs 6 to 10 cents per minute after volume discounts to send traffic over VPNs, said Mark Tharby, Nortel's director of enterprise marketing for the Magellan family.

To take advantage of the new Passport technology, customers may have to risk carriers invoking termination clauses in their VPN term contracts, but that is a risk many customers appear willing to take, Tharby claimed.

Alternatively, because Passport installations are often the result of a fairly long sales cycle, customers can time their launch of Passport voice networking with the expiration of their carrier contracts, he said.

The Magellan Passport voice networking software upgrade is scheduled for a December release.

©Nortel: (800) 466-7835.

Unshackled Lucent backs voice over 'Net

By David Rohde
Atlanta

No. 1 PBX manufacturer Lucent Technologies, Inc. added its considerable weight to the voice-over-the-Internet movement at NetWorld+Interop 96 here.

According to Lucent's road map, users sometime in 1997 will be able to take the vendor's already unified E-mail/voice mail PC interface for intracompany communications and make it so that both types of messages can be be sent to anyone over the Internet.

Corporate network managers will have the option to install IP telephony servers, linked via T-1 or ISDN Primary Rate Interface to the company's PBXs, and use these to send voice and fax messages across the 'Net avoiding carrier tolls.

Lucent officials were careful to put limits on the immediate applications of the company's Internet strategy. The new Internet telephony servers, for example, will take voice and fax traffic off the public network "for items that do not require [the public network's] level of security, response and reliability," according to the company.

In the messaging arena, the Internet capability will be an extension of Lucent's recently released Version 4.0 of Intuity Audix, the company's multimedia messaging system.

ON LINE
Check out recent articles about the heated Internet telephony market. Enter the number to the right in the DocFinder box on the home page.
FIND IT ON FUSION
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Network World Fusion
http://www.nwfusion.com

The recent release contains a typical E-mail client screen interface but with a voice icon that, when chosen by the user, begins a voice mail recording into a multimedia PC or a ring-through to the user's telephone to begin recording the message.

"Now we've incorporated [Simple Mail Transfer Protocol Multi-purpose Internet Mail Extensions] into Intuity Audix 4.0," said Jorge Blanco, a market manager for Lucent's Multimedia Message & Response division. As a result, the user could input a recipient's 'Net address in the Intuity Audix screen and begin either an E-mail or voice mail message — or one as an attachment to the other — for transport over the Internet

Beta trials will not begin until the beginning of next year, with general availability slated for the second half of the year.

The Internet telephony server will take voice and fax feeds from either a Lucent or other manufacturer's PBX and convert it to IP packets for transmission over the Internet. Such a configuration will enable enterprises to enjoy the cost benefits of IP telephony without requiring installation of special software on every user's desktop, said Ruth Killeen, AT&T market manager for new business development.

Yet users with an ordinary PBX sitting behind Lucent's telephony server could also make and receive Internet calls to outside parties with IP telephony software packages, Killeen said.

Lucent is considering Windows NT and Unix versions of the software.

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It's internet. It's intranet. It's a whole new ballgame.

IBM beefs up its Comm Server

Software to gain improved SNA and TCP/IP connectivity in upcoming versions.

By Michael Cooney
Atlanta

Next month, IBM will unveil new versions of its Communications Server that support more users and protocols.

IBM executives here said the company would be coming out with more powerful versions of both Communications Server for AIX and OS/2 that include improved TCP/IP and SNA connectivity.

The new features, along with a reported performance boost, could help in IBM's battle against Microsoft's Windows NT-based SNA Server. All three products provide gateway connectivity to mainframe resources with a variety of communications options, such as support for 3270 emulation packages and LANs.

IBM also revealed that after this release, it was off-loading future development of the Communications Server for AIX to Data Connection, Ltd. (DCL), a software development firm based in England. DCL offers a variety of software and has had development relationships with IBM in the past. In fact, it is the only company other than IBM that offers an Advanced Peer-to-Peer Networking code development package for third-party software developers.

"DCL will develop code, deliver and test all features of the Communications Manager for AIX after this release," said Bill Duncan, manager of enterprise software for IBM. "We made this alliance with DCL because we thought they could get new products and features to market faster."

The company will roll out Communications Server for AIX Version 4.2, which adds support for APPN's High Performance Routing (HPR) and dependent LU Requester (dLUR) functions. These features will let users deploy the server in multiprotocol nets where IBM mainframe connectivity is a strategic requirement, Duncan said.

HPR is next-generation APPN technology that, among other things, allows users to route around failures; dLUR lets legacy 3270 applications communicate over APPN-based nets.

The new software package will also support ATM LAN emulation server functions, allowing users to connect legacy LAN applications to high-speed ATM backbones.

For OS/2 users, the IBM tool will support more protocols and features improved performance — key requirements as IBM tries to establish the package as a commercial server, analysts said.

Communications Server for OS/2 Warp Version 4.1 will support 2,000 users and as many as 20,000 sessions with an SNA-compatible mainframe. The package will also pick up a tn3270E gateway, so it will be able to provide SNA mainframe access over TCP/IP nets. Version 4.1 also supports NETBIOS and IPX traffic flows over either an SNA or TCP/IP backbone.

This release also boasts improved performance. According to tests done by The Tolly Group, an independent test lab, Version 4.1 delivered lower response times and better throughput than Microsoft's SNA Server Version 2.11 (see graphic).

Both new releases will be available by year-end. Pricing was not revealed. ■

TOLLY GROUP'S TEST HIGHLIGHTS

- ▶ Communications Server for OS/2 Warp 4.10 delivered better throughput with lower CPU consumption than Microsoft SNA Server 2.11 in all configurations tested.
- ▶ With similar CPU utilization, Communications Server's single-Pentium processor configuraton had twice the throughput of Microsoft SNA Server's dual-Pentium processor configuration.
- ▶ Communications Server delivered lower response time under all load conditions than Microsoft SNA Server in all configurations tested.
- ▶ Communications Server's single-Pentium processor configuration had sub-100 millisecond response time at more than double the transaction load of Microsoft SNA Server running on a quad-Pentium processor configuration.

SOURCE: TOLLY GROUP, MANASQUAN, N.J.

Start-up Diffusion targets information confusion

By Barb Cole
Mountain View, Calif.

Imagine that your boss sends you an important document by fax and is waiting impatiently for your feedback. Unfortunately, you are nowhere near the fax machine, but have a laptop that could have conveyed the same information if the document had only been sent via E-mail.

PROFILE: DIFFUSION

Jim Gagnard, CEO

Headquarters: Mountain View, Calif.
Founded: 1995, by two former Borland executives
Management: Privately held; has received more than $6 million in venture capital
Financials: Richard Schwartz, chairman and chief technology officer; Chuck Grasso, vice president of engineering; Jim Gagnard, chief executive officer
Primary products: Intranet software for managing delivery of information through the Internet, E-mail, faxes, printers and pagers
Key Competitor: Cognisoft

The result? You get the information too late and your boss is livid: "You should have *known* to be near the fax machine."

A start-up company launched last week is building software to solve just such problems.

Diffusion, Inc. is the brainchild of two former Borland International, Inc. executives: Richard Schwartz, co-creator of the Paradox desktop database, and Chuck Grasso, erstwhile chief architect for Borland Interactive.

The company is keeping quiet about product details until later this year, but said it is prepping a Windows NT-based application that will allow senders and receivers of data to customize the way information is delivered across corporate intranets.

The application is aimed at ensuring that end users get critical information no matter where they are. Thus, it will support the transmission of data via corporate intranets, the 'Net, E-mail systems, fax machines, printers and pagers, company officials said. The company will initially target large sales organizations looking to deliver information to the field, the founders said.

The application will ride atop existing networks, mail systems and databases, and will let users publish information to select users and subscribe to certain data updates. "The software can determine which people are supposed to receive the information and in what format," said Jim Gagnard, Diffusion's chief executive officer, who previously held top posts at Avalon Software, Inc. and Trinzic Corp.

Ruthann Quindlen, a Diffusion board member and general partner at Institutional Venture Partners, a San Francisco venture capital firm, said the product is unique because it does not require users to be proactive about fetching pertinent data. "You don't have to go out and find the data. It is sent to you based on a profile," she said.

Company officials said they are carving out a new software category, though they admit that several firms are developing software to improve the flow of information on corporate intranets. A group of former Microsoft managers recently founded Cognisoft Corp. and announced their first product, IntelliServ, software that collects information from multiple data sources and sends updates to affected individuals only.

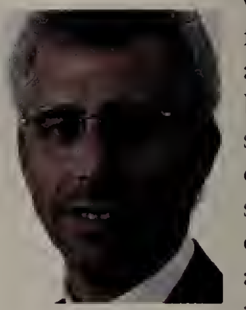
©Diffusion: (415) 934-2550.

Tivoli, Intel unite to manage their desktops and servers

By Michael Cooney
Atlanta

Intel Corp. and Tivoli Systems, Inc. last week announced plans to jointly develop products and technology specifications to ease the management of widely distributed servers and desktops.

The companies agreed to make their flagship management products — Tivoli's TME 10 and Intel's LANDesk — work together, as well as resell key components of each other's technology in an effort to provide customers with more comprehensive management packages.



Tivoli's *Moss wants to link his company's TME 10 management system with Intel's LANDesk package.*

The alliance, announced at NetWorld+Interop 96 here, should also eliminate the expense and time customers spend cobbling together end-to-end management systems from packages not designed to work together, Tivoli executives said. "There is no seamless way to distribute software or grab event data across today's enterprise and workgroup products, but we are allying with Intel to achieve this integration," said Frank Moss, chief executive officer and president of IBM's Tivoli Systems.

The market for managing servers and desktops has heated up in recent weeks, with McAfee and Seagate Technology, Inc. announcing enterprise management packages, and systems management giant Computer Associates International, Inc. joining the Desktop Management Task Force.

Much of Intel and Tivoli's work will revolve around the development of software called the Management Services Broker (MSB), which will let LANDesk and TME 10 share data. For example, the software will let TME 10 grab inventory or hardware performance data from a LANDesk-managed ser-ver and bring it back to the TME 10 console. MSB will also let companies distribute software from a TME 10 console to servers managed by LANDesk across the enterprise.

In November, the companies will make the MSB API public and, ultimately, offer a reference implementation free to any vendor that wants to tie its management packages to LANDesk or TME 10. Two vendors — McAfee and Symantec Corp. — last week announced support for MSB.

Also under the agreement, the companies will develop software modules and agents that will fit in both LANDesk and TME 10 — the idea being that all future Intel-based servers or clients will be outfitted with TME 10 components out of the box, said Martin Neath, vice president of Tivoli's core products group.

Tivoli also expanded its licensing deal with Intel to include LANDesk Client Manager, LANDesk Server Manager Pro and LANDesk Workgroup Manager, effectively making Tivoli a one-stop shop for Intel-based management products.

©Tivoli: (512) 436-8000.

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Okay,
So This Is The Future
Of The Enterprise.

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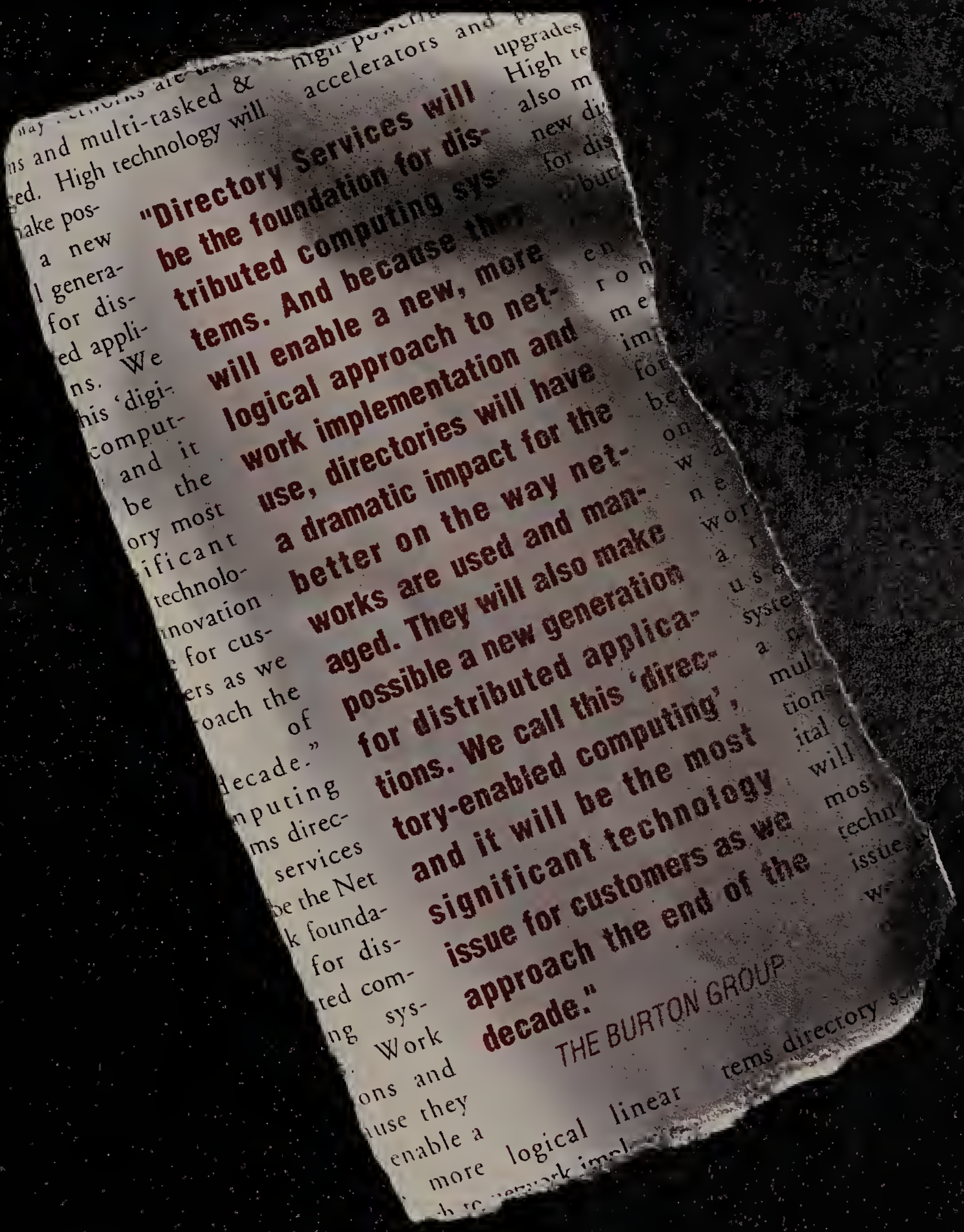

"Directory Services will be the foundation for distributed computing systems. And because they will enable a new, more logical approach to network implementation and use, directories will have a dramatic impact for the better on the way networks are used and managed. They will also make possible a new generation for distributed applications. We call this 'directory-enabled computing', and it will be the most significant technology issue for customers as we approach the end of the decade."

THE BURTON GROUP

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Microsoft gets ready to warehouse data

By John Cox

Phoenix

Microsoft Corp. last week unveiled its data warehousing plans along with a proposed standard for creating a repository of specialized information, called metadata, that can be used by third-party data management tools.

Microsoft is aiming the SQL Server 6.5-based offering at small to midsize data warehouses, according to analysts.

Data warehouses typically pull data from several different sources and store it in a consistent format in a larger database, where it can be used for complex, decision support queries. However, extracting, formatting (or transforming), moving and updating data are complex operations.

"Data warehousing is harder today than it needs to be," said Dan Basica, product manager for Microsoft's SQL Server. "A lot of customers are doing 'home cooking' to get these things to work — mixing and matching different products."

To address this problem, Microsoft announced:

- Active Data Warehousing Framework, which defines an overall model for data warehousing and a set of Component Object Model interfaces that create a standard way for data warehousing tools to share information.
- An alliance of warehouse vendors, which will work with Microsoft to refine the framework's specification and build it in to products.
- Several planned additions to Microsoft SQL Server, including advanced indexing, parallel query processing, new database join techniques and expanded import capabilities to speed data loading.

One critical element is the still-unreleased Microsoft Repository, an object-oriented repository that is being built by Microsoft and Texas Instruments, Inc.

The product will host the Metadata Repository, the storehouse of information about the raw data in the warehouse.

"We think this [Metadata Repository] is very important," said Peter Kastner, vice president of commercial systems at Aberdeen Group, Inc., a Boston-based research company.

Metadata will eventually make it possible to automate many data warehouse tasks and make the warehouse itself an interactive source of current or real-time data, according to Kastner. ■

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IntranetWare

Continued from page 6

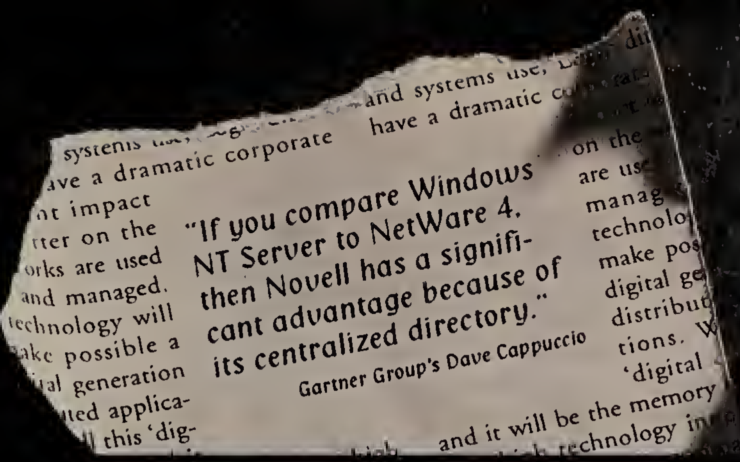
in Stamford, Conn., questioned the potential success of Novell in the Web market, due to its late entry and vast competition.

"People buy Novell products because they are good at file and print, and they are way ahead with the directory service," he said. "Their customers would have been better off if Novell stayed focused on making those better and then partnering with the leaders in the Web market to get the leading edge Web services running on top of NetWare."

According to Chip Novick, Novell vice president of marketing, future versions of IntranetWare will include more advanced Web services. IntranetWare 2.0, which will ship next spring, will support virtual private networks and have improved remote access capabilities. Novick said by next summer, Novell will add Java support, proxy services and native TCP/IP support.

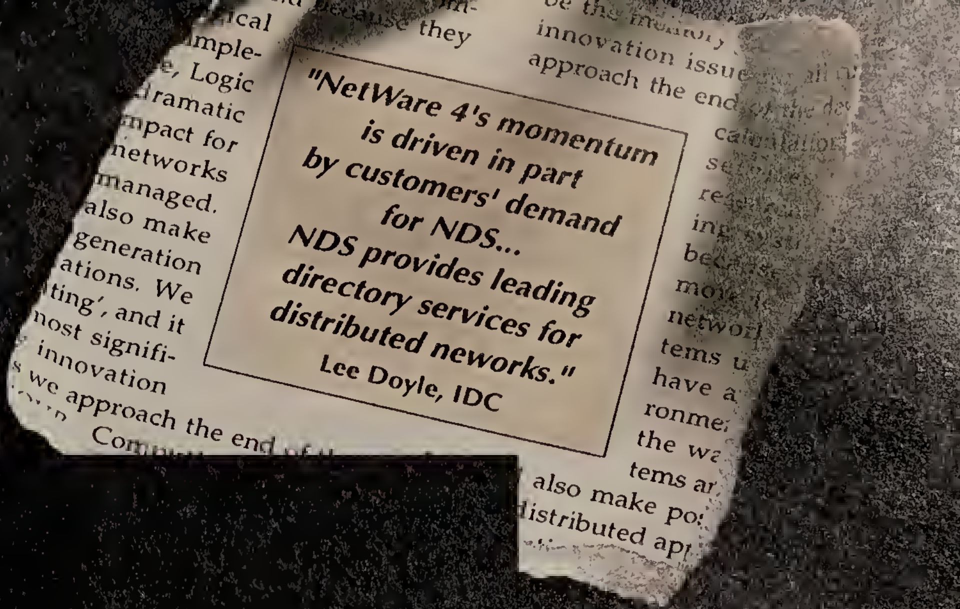
Novell officials also said last week that the company will offer a low-end IntranetWare bundle code-named Kayak that will give customers with fewer than 50 end users all the networking services they need in one box.

Kayak will include NetWare 4.11, Web Server 2.5 and several third-party messaging, fax and network connectivity products. ■



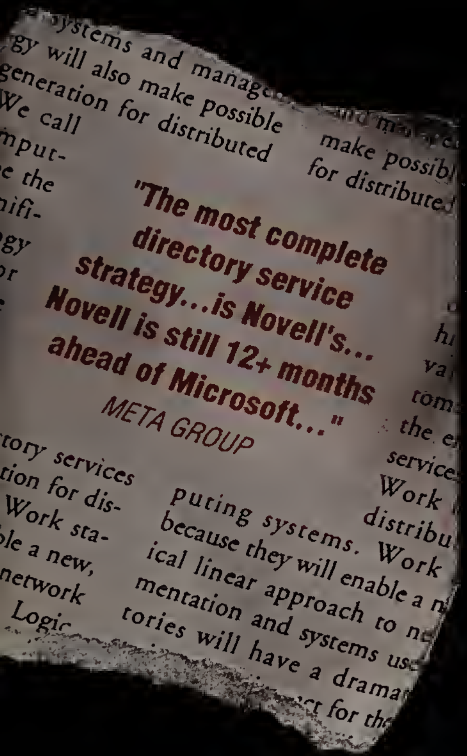
"If you compare Windows NT Server to NetWare 4, then Novell has a significant advantage because of its centralized directory."

Gartner Group's Dave Cappuccio



"NetWare 4's momentum is driven in part by customers' demand for NDS... NDS provides leading directory services for distributed neworks."

Lee Doyle, IDC



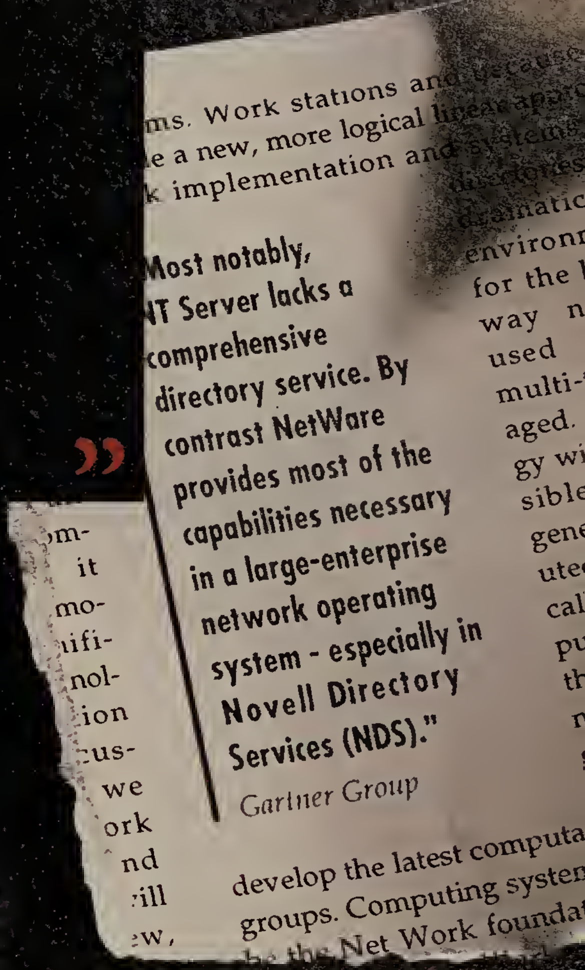
"The most complete directory service strategy...is Novell's... Novell is still 12+ months ahead of Microsoft..."

META GROUP

"

OKAY, SO NOVELL® FOUND A FEW ANALYSTS WHO SHARE ITS VISION.

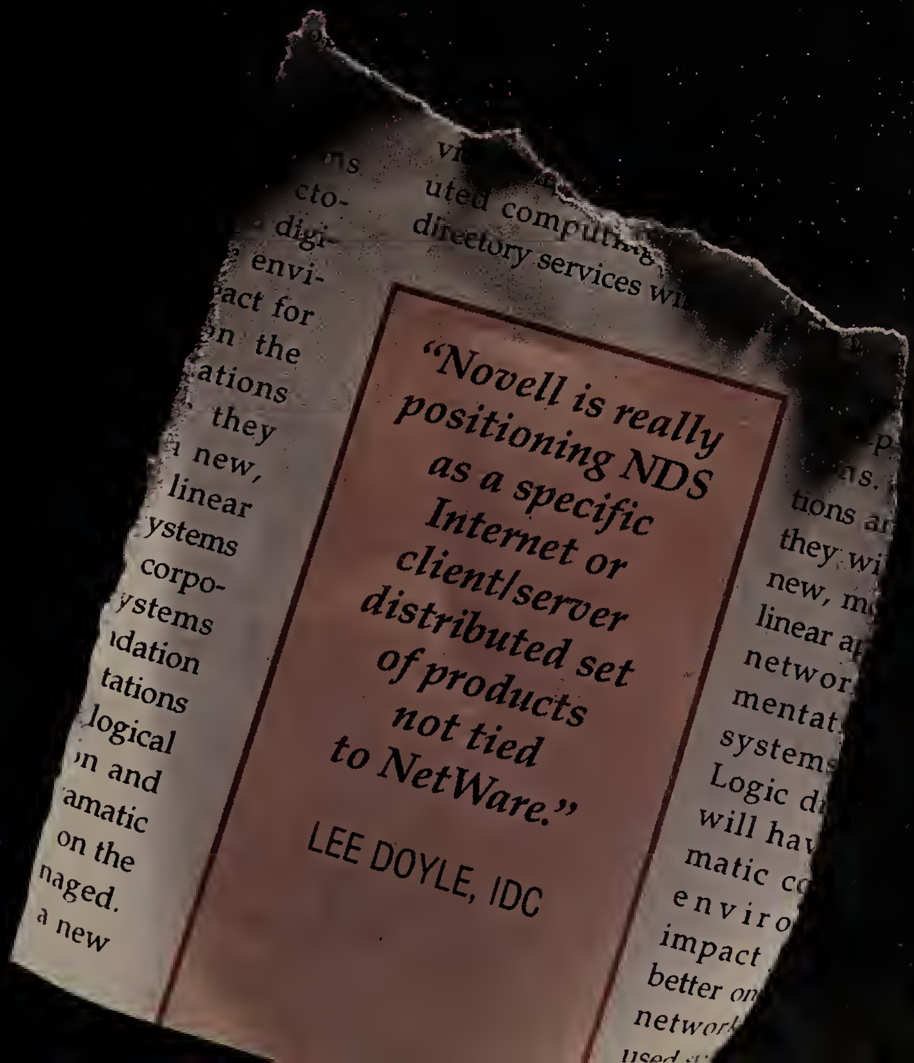
"



"Most notably, NT Server lacks a comprehensive directory service. By contrast NetWare provides most of the capabilities necessary in a large-enterprise network operating system - especially in Novell Directory Services (NDS)."

Gartner Group

BUT THAT DOESN'T MEAN REAL WORLD CUSTOMERS WILL.



"Novell is really positioning NDS as a specific Internet or client/server distributed set of products not tied to NetWare."

LEE DOYLE, IDC

U.S. Postal Service to lick E-mail security problems

By Barb Cole
Washington, D.C.

The U.S. Postal Service wants to carry your most sensitive corporate E-mail across the Internet.

The federal agency is expected to announce next month an electronic postmark that will time-stamp E-mail, verify senders and ensure that mail messages arrive unaltered, postal officials confirmed last week.

Although encryption software is already widely available, the post office's Electronic Postmarking Service is unique in that it may extend some legal protection to corporate mail networks.

For example, tampering with Postal Service computers or the contents of mail sent via the Electronic Postmarking Service could be considered a crime under federal laws, according to Paul Raines, program manager for electronic commerce services at the Postal Service.

The service, which should be available nationwide next year, requires mail senders to transmit messages to the post office's server via the Internet or a private network. The messages are then translated into a long number, digitally signed by the post office, archived and sent to the recipient to be viewed using special client software.

"It's more than authentication," said Gerry Baranano, vice president of sales and marketing at Aegis Star Corp., a Palo Alto, Calif., company developing the technology. The service also provides an audit trail and backup copies of mail messages, he said.

The cost is expected to be 22 cents for an electronic postmark on files up to 50K bytes, but postal officials said corporate discounts will be offered.

Mark Levitt, an analyst at International Data Corp. in Framingham, Mass., said the post office has been watching the rising popularity of E-mail with concern and is trying to take advantage of its strength as an agency trusted with confidential information.

WE REALLY LIKE E-MAIL

In 1995, the number of installed electronic mailboxes topped 38 million in the U.S., up 35% from 1994, according to International Data Corp. of Framingham, Mass. U.S. electronic mailboxes represent 55% of the installed mailboxes worldwide, IDC said.

"They have a shot," Levitt said.

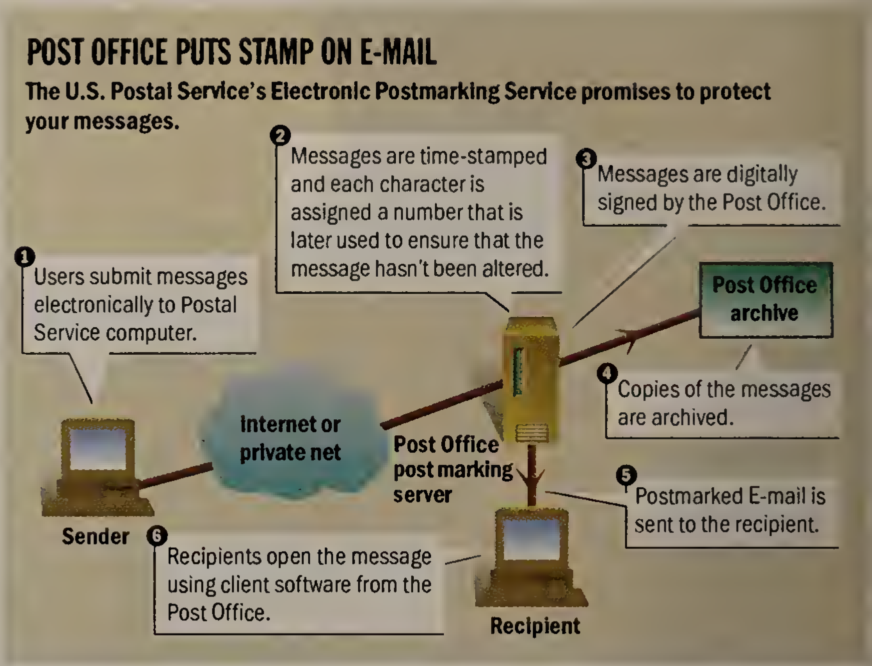
What the Postal Service does not have is a customer base that could take immediate advantage of the service, so partnerships with mail vendors will be key, he said.

The service will not be a panacea, though, because messages may still travel unprotected to the Postal Service computers. But it could prove to be a decent alternative to dedicated networks between trading partners, observers said.

"Security is a big issue for E-mail users," said Paul Moniz, vice president of technology at the Electronic Messaging Association in Fairfax, Va. "Users want their E-mail to get through unmolested and unread."

Customers, however, were skeptical of the service and the expected 8-minute delay it would impose on the delivery of messages across the 'Net.

"It sounds like there's a latency problem here," said Paul Rarey, a member of the Internet Mail Consortium industry group. ■


POST OFFICE PUTS STAMP ON E-MAIL

The U.S. Postal Service's Electronic Postmarking Service promises to protect your messages.

① Users submit messages electronically to Postal Service computer.
② Messages are time-stamped and each character is assigned a number that is later used to ensure that the message hasn't been altered.
③ Messages are digitally signed by the Post Office.
Post Office archive
④ Copies of the messages are archived.
Internet or private net
Post Office post marking server
⑤ Postmarked E-mail is sent to the recipient.
Sender
⑥ Recipients open the message using client software from the Post Office.
Recipient

AT&T pushes ISDN; carrier also assembles new service bundle

Challenges LECs with in-state tariffs, partners with ISDN hub maker.

By Joanie Wexler
Bedminster, N.J.

AT&T last week said it has filed a slew of ISDN service tariffs and has signed a deal to resell ISDN equipment, moves that together give the carrier a much more complete set of ISDN offerings.

AT&T, which already offers interstate and international ISDN services, said it has filed ISDN tariffs in 48 states for intrastate and intra-local access and transport area service.

The tariffs bring to the table ISDN pricing that challenges local exchange carrier (LEC) rates. AT&T has offered in-state ISDN services before but until now has not filed tariffs specifically covering intrastate and intra-LATA regions. The absence of those tariffs resulted in customers paying for services based on AT&T interstate ISDN tariffs, which were often higher than LEC prices (see graphic).

The tariffs cover ISDN Primary Rate Interface lines, which run at T-1 speeds. However, PRI lines are intended to be shared among multiple customers, which can each purchase individual 64K bit/sec channels, said Dick Slezak, AT&T's global ISDN managing director.

Customers reacted enthusiastically to the moves by AT&T, which claims its ISDN service revenue has already been growing at an 88% compounded annual growth rate since mid-1993.

AT&T files and customers save

AT&T's tariffs for intrastate ISDN services save customers significant amounts of cash, compared with what they would have paid using the old default interstate tariffs.

Intrastate 64K bit/sec ISDN peak period day rates (per minute, in cents)

	Previous default AT&T interstate rates	New AT&T intrastate rates*	LEC intrastate rates
California	11.9	7.6	11.4
Illinois	11.9	7.8	8.7
Maryland	11.9	6.6	14.0
New York	11.3	9.0	13.7
Ohio	12.8	7.2	15.0

* Assumes AT&T is providing net access on both ends of the call. Different rates apply if LEC provides access at one end.

"AT&T's ability to provide all our ISDN services, including voice calls, [eases] price and billing management," said Linda Tratnik, a committee chairman for the SDN Users Association, Inc., a group comprising customers of AT&T's switched digital services.

AT&T has also joined with Incite, a Dallas vendor that makes a hub for extending an ISDN circuit to multiple Ethernet LAN users. They will bundle and resell each other's offerings, though there is no branded service/equipment package from either company with its own name and special pricing.

Incite's Conversational Media system, which sits on the customer site, accepts an ISDN circuit, converts ISDN protocols to ISO Ethernet and distributes the signals to LAN users via a 6M bit/sec stream running on top of Ethernet.

The system costs about $4,000 per desktop with six or more users, according to Incite. About $2,900 of that goes to a video coder/decoder and camera.

©AT&T: (800) 222-7956; Incite: (800) 946-2483.

AT&T.ALL to bundle local, long-haul services.

By David Rohde
Atlanta

AT&T last week entered the all-services-on-one-bill bundling sweepstakes with an offering that combines long-distance, intraLATA toll, messaging, Internet access, cellular and calling cards — plus local telephone service when AT&T introduces it.

But carrier officials said the service, dubbed AT&T.ALL, is not optimized to displace separately purchased high-end voice and data services.

The service was designed to let mid-size companies keep their existing AT&T services but have all the charges appear on a single bill, said Dan Schulman, AT&T's vice president of marketing for business services. Customers will also have a single 800 number through which their inquiries will be routed, he said.

AT&T.ALL was designed to let mid-size companies have their AT&T services on one bill, but key data services such as Accunet private lines and InterSpan services are not included.

But key data services such as Accunet private lines and the InterSpan family of fast-packet services are not included in AT&T.ALL. AT&T is separately integrating its InterSpan billing across service lines, such as frame relay and ATM.

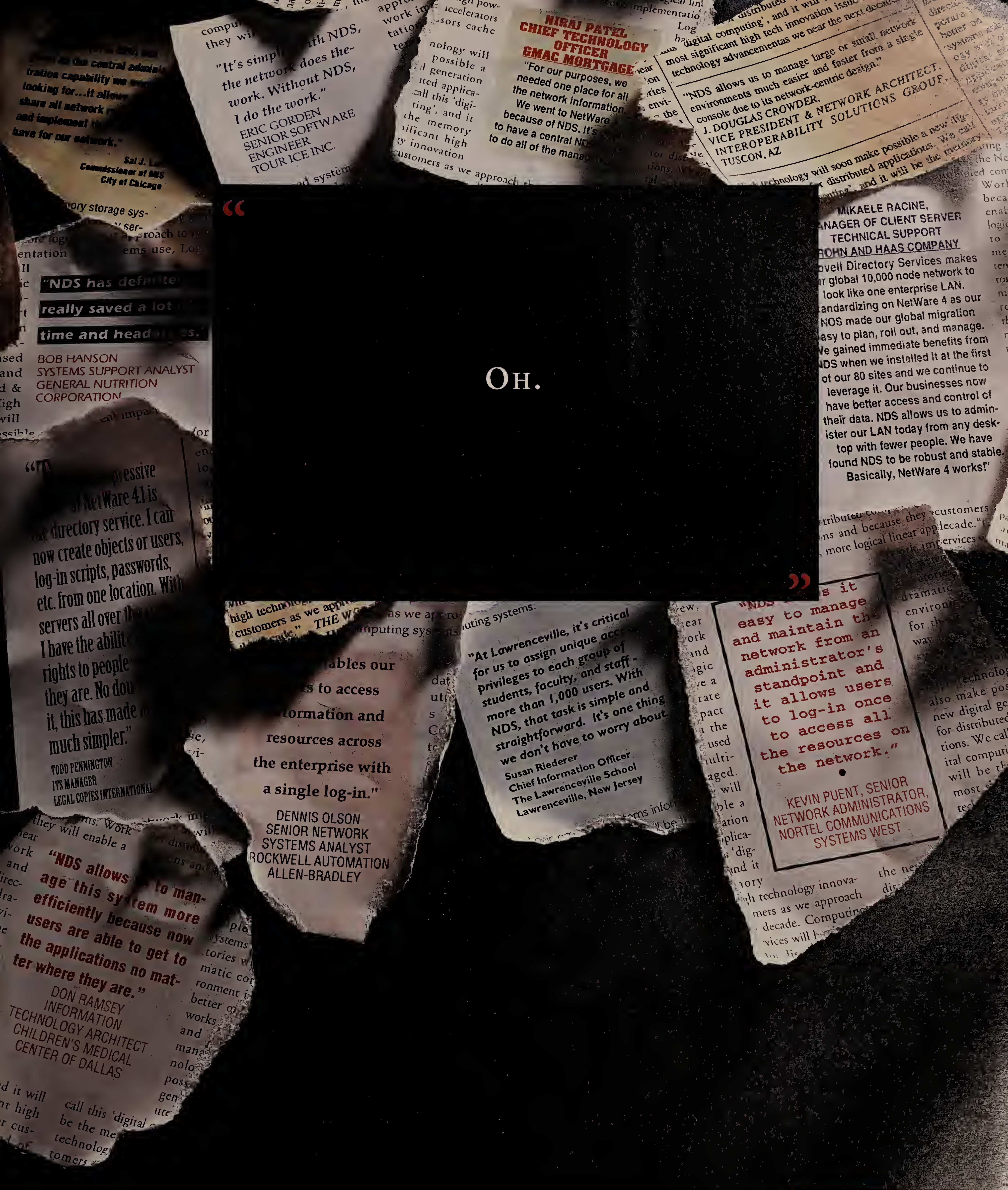
AT&T.ALL appeared one week after MCI Communications Corp. introduced networkMCI One, a bundled business service combining many of the same categories of services (*NW*, Sept. 16, page 14).

According to Schulman, the difference between the two is that AT&T is allowing customers to keep their month-to-month billing rates and terms when they transfer their existing services to the AT&T.ALL platform.

MCI is imposing additional conditions such as requiring customers to sign a term contract of at least one year, he said. ■

CORRECTION

The Symplex Direct Route DR-1 reviewed in the Sept. 9 issue supports IP and IPX routing.



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"For our purposes, we needed one place for all the network information. We went to NetWare because of NDS. It's to have a central ND to do all of the manag

"NDS allows us to manage large or small network environments much easier and faster from a single console due to its network-centric design."
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Commissioner of MIS
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"NDS has definitely really saved a lot time and head
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SYSTEMS SUPPORT ANALYST
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MIKAELE RACINE,
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“Oh.”

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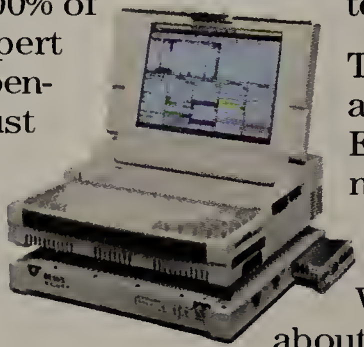

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Briefs

Motorola, Inc. Information Systems Group *last week announced at Net-World+Interop 96 that its 925 Accessway* **remote access concentrator** *now supports both ISDN and analog dial-up access, sensing the type of incoming call and answering appropriately.*

The software update will be available in November.

The company also announced a dual Primary Rate Interface ISDN/T-1 module for Accessway, allowing two PRI connections, two T-1 connections or one of each. The module lists for $5,995 and is available now.

Motorola: (800) 221-4380.

SDL Communications, Inc. *last week announced an internal modem for PCI-based workstations that supports speeds up to 2M bit/sec over standard telephone lines.*

The WANic modem supports the ANSI **Asymmetric Digital Subscriber Line** *standard, which enables high-speed, full-duplex connectivity over twisted-pair lines.*

Drivers for Windows, Windows NT, Windows 95 and most popular forms of Unix are also supported.

Starting at $600, WANic will be available next month.

SDL: (508) 238-4490.

Farallon Communications, Inc. *has upgraded its Netopia line of* **ISDN routers** *to support data over voice-grade ISDN channels as a way for users to save money.*

In some regions, local calls for voice ISDN channels are free, but local data ISDN calls are billed by the minute.

The new software, which is free, also supports IPX routing in addition to IP routing over ISDN, as well as calling number authentication to limit users who can access the network.

Farallon: (510) 814-5100.

News analysis

Cisco to tackle corporate, ISP bottlenecks

By Charles Bruno

Cisco Systems, Inc. is taking dead aim at two fronts with a new flavor of IP switching it has dubbed Tag Switching. Cisco claims it will help Internet service providers improve reliability by layering quality of service into their networks and will boost the capabilities of users' large router-based networks.

Ipsilon's *Lang says, "we provide a range of granularities for virtual circuit usage."*

In effect, the Tag Switching technology will enable Cisco's existing router base to buck up performance of their routing nets without an immediate wholesale move to ATM switching.

"A lot of corporate network builders will look at this and take comfort that if this is safe for the Internet — the biggest of IP networks — then it can help them, too," said Thomas Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy.

Like IP switching, Tag Switching turns an ATM switch into a router. Today, IP switching dynamically shifts between store-and-forward routing and cut-through switching, based on the needs of IP traffic flows. (A flow is a sequence of IP packets sent from a source to a destination sharing the same protocol type — such as TCP or the User Datagram Protocol.) An IP switch chooses either mode, depending on the characteristics of the IP data flow. For instance, longer File Transfer Protocol flows — audio or video — get cut-through switching. The IP switch reserves hop-by-hop forwarding for short-lived E-mail, SNMP and Domain Name Service traffic.

IP switches mark each data flow for the type of service it deserves, thereby setting up virtual circuits on the fly, a practice Cisco said does not scale to Internet proportions. IP switching requires a large number of virtual circuits and a high degree of circuit setup, according to Brent Bilger, director of product marketing for Cisco's Service Provider Market unit.

For more info, including:
- **Details of Cisco's Tag Switching plan**
- **A look at Ipsilon's competing proposal**
- **Part 1 of our "Internet health report" series**

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The processors and switches in the backbone core of the Internet simply cannot process the amount of data generated by a TCP session running at OC-3 or OC-12 speeds, Bilger said. "The

See Tag Switching, *page 23*

GSN pledges fat mainframe pipe

By Michael Cooney
Atlanta

General Signal Networks (GSN) is looking to provide the growing legion of Microsoft Corp. SNA Server users with high-speed access to mainframe resources.

The company last week introduced its SNA Link/9000, a PCI bus-based interface card that will link SNA Servers with IBM's Enterprise Systems Connection (ESCON) mainframe channel at 17M byte/sec. ESCON is IBM's fiber-based mainframe channel communications technology, and the alternative to old copper-based bus and tag connections.

The two-port card will support any Intel- or Digital Equipment Corp. Alpha-based workstation to establish a high-speed fat pipe between servers and the mainframe. The company also expects to roll out SNA Link/9000 cards that fit in MIPS and PowerPC-based workstations.

"We are providing a scalable, high-performance way of retrieving large amounts of mainframe data from distributed servers," said Peter LaPorte, vice president of marketing for GSN.

The SNA Link/9000 is built on IBM's own ESCON Enabler Technology, which guarantees the card will be compatible with any IBM ESCON products, LaPorte claimed.

The company also now places itself in competition with other mainframe channel-attachment competitors, such as Polaris Communications, Inc. and Bus-Tech, Inc.

"Users looking to channel-attach SNA Server and provide full mainframe access to its LAN-attached workstations will applaud the alternatives they'll now have," said Anura Guruge, an independent analyst based in New Ipswich, N.H. "It opens up the market."

Pricing for the SNA Link/9000 was unavailable.

GSN also introduced its LAN Access Unit (LAU) for multiplexing 24 token-ring or Ethernet LAN segments onto two multimode fiber pairs for transmission over distances up to 2 km. The LAU is an alternative to multiple fiber repeaters, the company said.

©GSN: (609) 234-7900.

New products

Cisco backs promises

By Jim Duffy
San Jose, Calif.

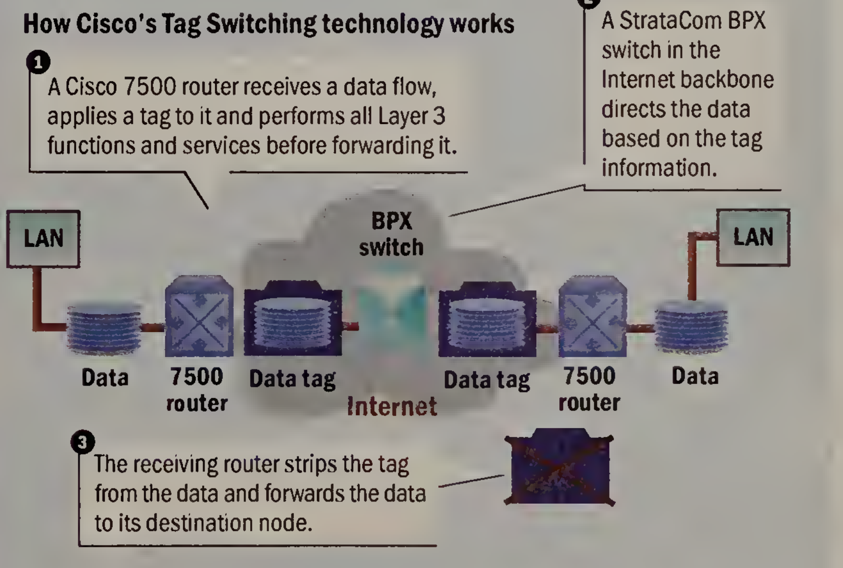
As part of its plan to help the Internet handle more traffic, Cisco Systems, Inc. has unveiled modules for its StrataCom ATM WAN switch that increase performance and scalability by a factor of four.

The products are aimed at Internet service providers facing a crunch as call volumes increase and the 'Net's routers begin to buckle (*NW*, Sept. 16, page 1). Some 80% of routers on the Internet are Cisco's, and the company is strapping those together with its recently acquired StrataCom switches to break 'Net bottlenecks.

The new Broadband Switching Modules (BXM) for the StrataCom BPX/AXIS switch are based on an ATM chipset developed by Cisco called Stratm. In tandem with the RISC processors on a BXM, Stratm enables a BPX/AXIS switch to handle 750,000 concurrent connections and 4,000 calls per second.

PLAYING TAG

How Cisco's Tag Switching technology works



① A Cisco 7500 router receives a data flow, applies a tag to it and performs all Layer 3 functions and services before forwarding it.

② A StrataCom BPX switch in the Internet backbone directs the data based on the tag information.

③ The receiving router strips the tag from the data and forwards the data to its destination node.

However, it is still unclear whether this level of density, combined with the recently announced Tag Switching scheme for directing IP flows through the network, will

See Cisco, *page 24*

Introducing the PowerEdge 2100: Redefining the entry-level server.
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3 of 4 Top Firms Report Improved Network Performance

Wall Street may be feeling a bit queasy, but it's definitely a bull market for Dell.

The Austin, Texas-based computer maker has scored a big hit among some of the largest investment banks with - of all things - its line of PowerEdge servers.

"It might seem surprising," said one source. "When people think of Dell, they think of desktops and portables. But Dell's adherence to open network standards makes their servers a natural on large corporate networks."

It also makes Dell unusual among its competitors, most of whom are only now beginning to abandon their proprietary standards in favor of a more open approach. "I don't want to name names, but companies like Co

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The following could be considered insider information. Run with it.

- Dell is ranked fifth in US server market share
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- 5 of the 6 largest automobile makers buy Dell
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- 92% of Dell's $5.8 billion revenues come from businesses and government agencies

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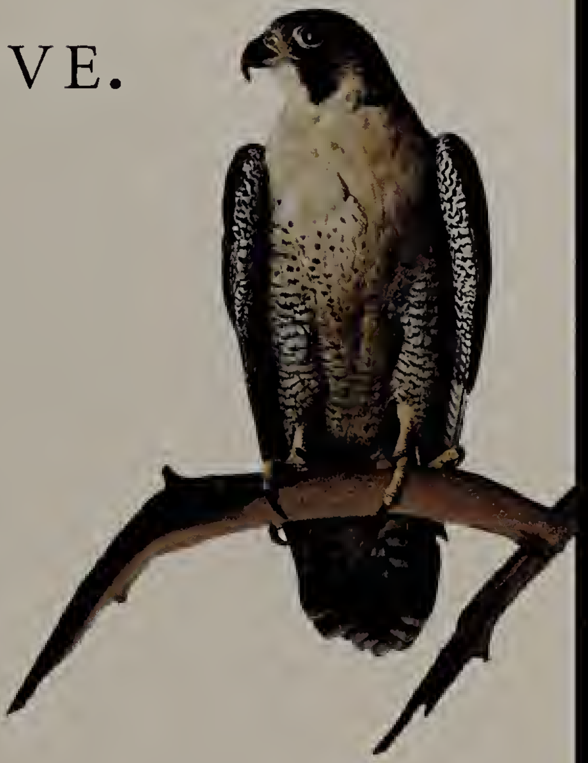

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Tag Switching

Continued from page 17

number of packets per second will overwhelm today's devices," he said.

Consequently, Cisco's Tag Switching proposal relies on a process whereby routers (and their routing cousins embedded in ATM switches) preconfigure routing tables by associating a tag with every available route. Labeling is precalculated and tied to existing routes, rather than setting up virtual circuits on the fly and marking them according to individual traffic flows. When tagged routes are precalculated, each routing device then communicates an index of those tags to adjacent devices.

That way, when a router is trying to determine the best path for data, it does not go through a complicated table lookup, but instead locates the proper tag entry in an index, gets its processing instructions and slaps on a tag so the next router knows where to forward the data.

"There's no need for the ATM fabric to set up [virtual circuits] since most of them are statically provisioned already," Nolle said.

Tag Switching will "enable ISPs with heavy investments in routers to do virtual circuits and load balancing across their backbones," Bilger said.

Don't expect any immediate improvement, though, in Internet routing performance. Tag Switching will not surface until the first quarter of 1997 in the form of Internetwork Operating System software upgrades for Cisco 7500 routers. In the second half of next year, Cisco plans to release software for its StrataCom, Inc. BPX switches that allow them to communicate via Layer 3 routing to edge routers. Likewise, Cisco will kick out Cisco 7500 upgrades so the routers can sync up with the BPXs to do Tag Switching.

Ipsilon Networks, Inc. executives, meanwhile, brush off Cisco claims that their IP switching devices cannot scale to Internet proportions. "They say we burn more virtual circuits," says Larry Lang, vice president of product management at Ipsilon. "But we provide a range of granularities for virtual circuit usage." Ipsilon also points to a recent demonstration where companies such as IBM, 3Com Corp and Hewlett-Packard Co. participated in a switchathon based on Ipsilon IP switching protocols.

"We're pleased that [Cisco] is legitimizing IP switching because we're shipping products now and they're not," Lang said. ■

Remote access outsourcing's time has come

By Tim Greene
Boston

Backed by new, large, dial-up concentrator boxes, carriers are in a better position to offer affordable outsourced remote access services — that is, if they choose to, said vendors that make the devices.

And although they have a few reservations, users seeking remote access solutions at the Network World Unplugged trade show here earlier this month seemed ready for such services.

Remote access service platforms

Product	Slots	Max. ports	Price
Ascend's TNT	16	2,000 modems, 4,000 ISDN or frame relay	$32,500-$485,000
Cascade's AX 1600	16	2,000 modems, 4,032 ISDN	Starts at $18,750

Lawton Read, technology consultant for Digital Equipment Corp., said he would embrace outsourced remote access rather than maintain the company's remote users, which number more than 1,000. "We've been trying to get rid of [the responsibility for managing remote access] for a long time," Read said.

Read hopes the new access devices will yield a service that does not require pricey dedicated ports in the carrier network. He has looked at that approach before as offered by MCI Communications Corp.

See **Remote access,** *page 24*

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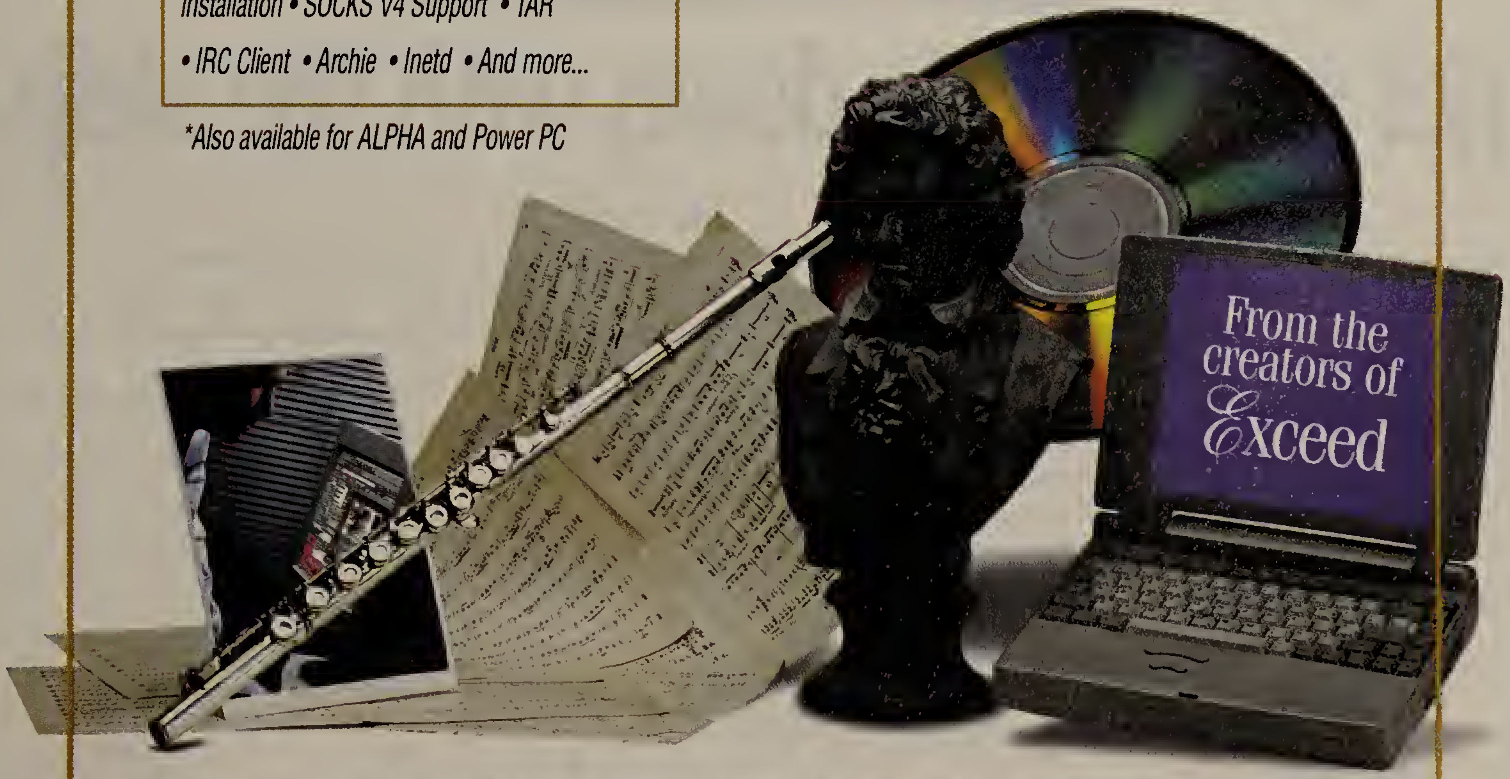

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Cisco

Continued from page 17

relieve the 'Net's performance problems (see story, page 17).

"The jury's still out on whether this particular technology will relieve congestion," said Dennis Brouwer, director of managed data services for Compuserve Network Services in Columbus, Ohio.

Cisco might be advised to revisit the way it implements the Border Gateway Protocol (BGP) on its routers, observers said. Cisco routers churn out more BGP data than necessary over the Internet backbone, said Craig Labovitz, a network engineer with Merit Network, Inc., an Ann Arbor, Mich., organization that collects 'Net statistics and chairs the North American Network Operators Group (NANOG). But Merit and NANOG have not yet determined whether the extraneous BGP data is something to worry about, Labovitz said. "The Cisco implementation decision accounts for a very tiny fraction of the huge numbers of pathological behavior we see" on the Internet, he said.

Cisco, however, cringes at any suggestion of a problem, tiny or otherwise.

"There are many features that we're announcing as part of this launch that enhance our ability to scale the BGP protocol and give the operators more control over it," said Andrew Greenfield, director of service provider marketing for Cisco's Service Provider business unit. "We continue to make enhancements in that area, and I don't think there's anyone that has nearly the expertise of Cisco in building these highly scalable protocols."

Stratm and BXM will help BGP scale, Cisco believes. The BXM modules include six- and 12-port 45M/34M bit/sec T-3/E-3, four- and eight-port 155M bit/sec OC-3, and one- and two-port 622M bit/sec OC-12 configurations. According to Cisco, the new modules enable the BXP/AXIS switch to support 8,000 T-1/E-1, 144 T-3/E-3, 96 OC-3 or 24 OC-12 ports.

The BXM cards also support the ATM Forum's Traffic Management 4.0 specification for available bit rate service and network congestion control, virtual trunking, Private Network-to-Network Interface 1.0, and multicasting for as many as 8,000 branch connections.

Base pricing for the BXM products starts at $38,000. They will start shipping next month.

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Remote access

Continued from page 23

and found it prohibitively expensive.

"A channelized T-1 is not cheap," he said. Sharing the port securely with other users should drive down the cost, he said.

The gear is ready

Ascend Communications, Inc. and Cascade Communications Corp. recently introduced high-density dial-up access devices for telephone carriers and Internet service providers.

The products — Ascend's TNT and Cascade's AX 800 and AX 1600 switches — could support corporate remote access outsourcing at a lower cost than less integrated alternatives, according to Cascade. Instead of stacking up banks of modems, corporations could let a carrier handle the remote calls and feed the corporate network with a single large pipe.

Ron Murphy, vice president of information systems for CNL Group, Inc., a financial firm in Orlando, Fla., said his No. 1 concern with such an arrangement would be security. "Who has access? What's my firewall? And who has control of it?" he said.

Brian Fitterman, a network programmer for Northeast Utilities, said the user also would want to be wary of changes that would be needed to their legacy equipment, either software or new hardware.

Dean Heltemes, remote access service manager for Cargill Corp. in Minneapolis, said the cost of outsourced remote access services might not balance the cost of a private solution. For example, the continuing cost of a service might easily outweigh the cost of installing a remote access server for 50 users, all of whom are dialing in with a local call.

But price is not the only concern. Murphy said the benefits of remote access are hard to quantify, and if they seem to promise better efficiency, productivity and customer service, CNL might try it. ■

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input. Bill.
Send."

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Carrier Services

Covering: Local and Long-Distance Services • Value-Added Networks • Cable, Satellite and Wireless Networks • Regulatory Affairs • Carrier-Based Internet Services

Briefs

■ **LDDS WorldCom** *last week became the first long-distance carrier to introduce a Web-based* **circuit-utilization** *reporting tool. The carrier's new Web Network Management Service (NMS) lets LDDS WorldCom users retrieve frame relay, toll-free and dedicated access line performance data through any computer with a Netscape Communications Corp. Navigator browser. For frame relay users, Web NMS provides near real-time tracking of discard-eligible traffic, and allows users to compare committed information rates to actual traffic loads.*

■ **MCI Communications Corp.'s** *top lawyer blasted both of the* **pending mergers** *of regional Bell operating companies at a recent Senate Judiciary Committee hearing. The proposed mergers of Bell Atlantic Corp. with NYNEX Corp. and SBC Communications, Inc. with Pacific Telesis Group "would impede the development of local competition in each of these RBOC regions," said Michael Salsbury, MCI executive vice president and general counsel.*

■ *At the Tele-Communications Association annual conference and exhibition in San Diego last week, the president of* **Sprint Corp.'s** *long-distance business unit, Gary Foresee, said the company is not bundling its new Passport dial* **Internet services** *with long-distance and wireless services. He claimed the billing systems are not yet in place to support the integration. The company will offer the bundling in the second quarter of next year. Still, if you want to at least buy Sprint services all in one place,* **RadioShack,** *the retail division of Tandy Corp., agreed to create a section of its stores to* **pitch Sprint offerings.** *Included are paging, Internet access and personal communications services (PCS). RadioShack will also sell wireless handsets branded by Sprint Spectrum, the PCS carrier owned jointly by Sprint and several cable TV companies.*

AT&T mobilizes in pursuit of sales forces

Company takes on much remote access worry, but still leaves several items up to user.

By Joanie Wexler

Basking Ridge, N.J.

Companies can now dump many of the headaches and upfront expenses associated with automating their sales and other workforces onto AT&T.

As part of its newfound initiative to offer service packages to specific user and vertical markets (*NW*, July 22, page 1), AT&T has announced a first-of-its-type network outsourcing service package, AT&T MobileWorkforce Networking. The service is available now.

Mobile Workforce resembles the AT&T Intranet Connect Service, announced in July as a revamp of the company's remote access outsourcing offering, AT&T NetWare Connect Service. The basic difference is that the mobile option is customized with a workforce automation platform and application software, such as a customer information management system and sales encyclopedia. It is also limited to 800-number access.

The AT&T service platform will convert protocols and E-mail systems for users, if those they are running do not match those of the platform. It also offers Microsoft Exchange-based E-mail services.

Intranet Connect, in contrast, is specific to IP and Novell, Inc. IPX protocols, and allows dial, 800 or frame relay dedicated access. It provides transport and server management services only; there are no applications associated with it.

What you get

For Mobile Workforce, customers pay $359 per user each month, plus a onetime per-user installation fee of about $1,000, depending on the number of users. AT&T provides special software, an access server on its own premises that it maintains, asset management and customer support.

Here is how it works: The customer buys a bunch of Windows 95-equipped laptops and modems and gives spares to AT&T. AT&T will overnight the spares, loaded with current user data, to users in need. The company hosts remote access server software and workforce automation application software it has licensed from Adaptive Strategies, Inc. in Cherry Hill, N.J., on a Compaq Computer Corp. ProLinea server. It also installs the client component onto the users' laptops.

Mobile users dial in via an 800 number to the AT&T server, which is used only by that customer and links to the customer's mainframe or other computer over a dedicated line. The user's back-end system feeds current company-specific data, such as inventory levels or prices, to the workforce automation software running on the AT&T-housed server.

The Adaptive software performs data synchronization so only new data is transmitted over the wide-area connections.

Customers should be aware that not all their mobile integration troubles are over.

Most notably, the 800 service and dedicated link from the AT&T server to the user's host are not included. AT&T's reasoning is that users can put those basic services toward their company volume discounts. "I'm not legally allowed to bundle contract [enhanced] services with basic services for a discount," explained Christine Groth, national marketing manager in the AT&T Advanced Network Solutions group. That could put a crimp in the style of users seeking integrated service bundles.

"AT&T has the opportunity here to leverage all its parts, but the left hand doesn't seem to be working with the right," said Dan Merriman, director of mobile and wireless communications at Giga Information Group, a consultancy based in Cambridge, Mass. "Bundling and integration are what will get services like this rolling."

Hugh Bishop, vice president of emerging technologies research at Aberdeen Group, Inc., a consultancy in Boston, said he would bet many customers would opt for bundling the network components into the package over the discount if given the chance. ■

AT&T makes most of Easy Commerce

Many of AT&T's service packages build on the company's Easy Commerce Solutions-Transaction Processing platform, whereby AT&T receives orders by multiple access methods, processes and formats them, and sends them on to customers for fulfillment.

Vertical packages

- ▶ InView network for insurers
- ▶ AT&T Catalog Wizard on AT&T Web hosting platform for retail market (in alpha test) *
- ▶ Portfolios for health care, banking, broadcast/media utilities*

Horizontal packages

- ▶ Order Express for call centers
- ▶ Easy Access for Timesheet Professional for mobile workers who must record their hours*
- ▶ Mobile user offering (possible)*
- ▶ Telecommuter offering (possible)*

* UNANNOUNCED

In-Site

Users dial AT&T for savings

By Joanie Wexler

Florham Park, N.J.

The willingness of companies to turn over big chunks of their networks to an outsourcer shows no sign of waning.

Witness a recent billion-dollar network outsourcing agreement between worldwide holding company Textron, Inc. and AT&T Solutions. AT&T was chosen to engineer, design and implement a platform to run most of Textron's net traffic in the U.S., Canada, Mexico, Europe and Australia. AT&T will handle an array of voice and data services, including E-mail and wide- and local-area networking.

One of Textron's goals will strike a familiar chord among U.S.-based multinationals: The vendor is looking to boost revenues derived outside the U.S. For Textron, which owns companies such as Cessna Aircraft, Bell Helicopter and AAVCO Finance, that means 35% of total revenues should be from foreign sources by the year 2000, said Bill Gauld, Textron chief information officer.

Expanding electronic links to globally dispersed divisions and customers means beefing up the network. The fastest way was to go to an outsourcer with heaps of manpower and access to the economies of scale that allow it to continually deploy the latest technologies, Gauld said.

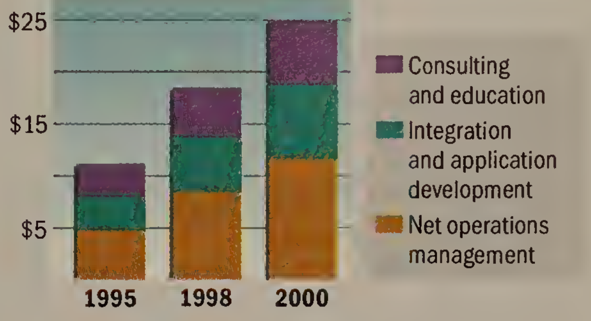
"On our own, we couldn't ramp up fast enough," he said.

A more traditional objective is to lower costs by merging vendors under one network management contract. In this case, Textron expects to save $125 million or 11% of its network costs over 10 years. Rick Roscitt, AT&T Solutions' managing partner of outsourcing, said his company will absorb Textron's 35-person international telecommunications staff. ■

PAY SOMEBODY TO DO IT

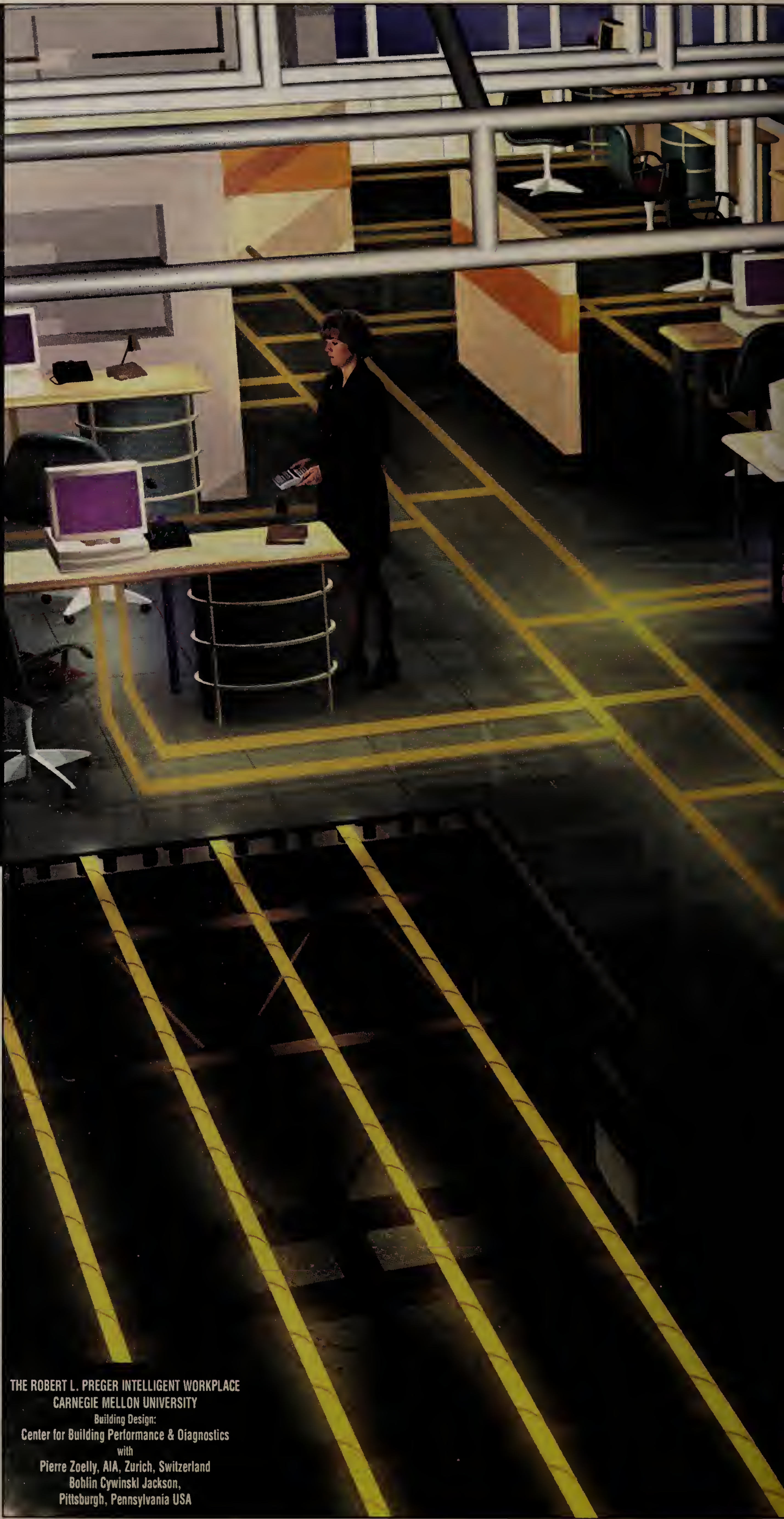
Companies' tendencies to turn to someone on the outside when they are strapped for network project resources doesn't appear to be close to waning.

Network outsourcing revenues (in billions of dollars)



SOURCE: DATAQUEST WORLDWIDE IT SERVICES GROUP, WESTBOROUGH, MASS.

There's only one way to get perfect harmony from a copper system.



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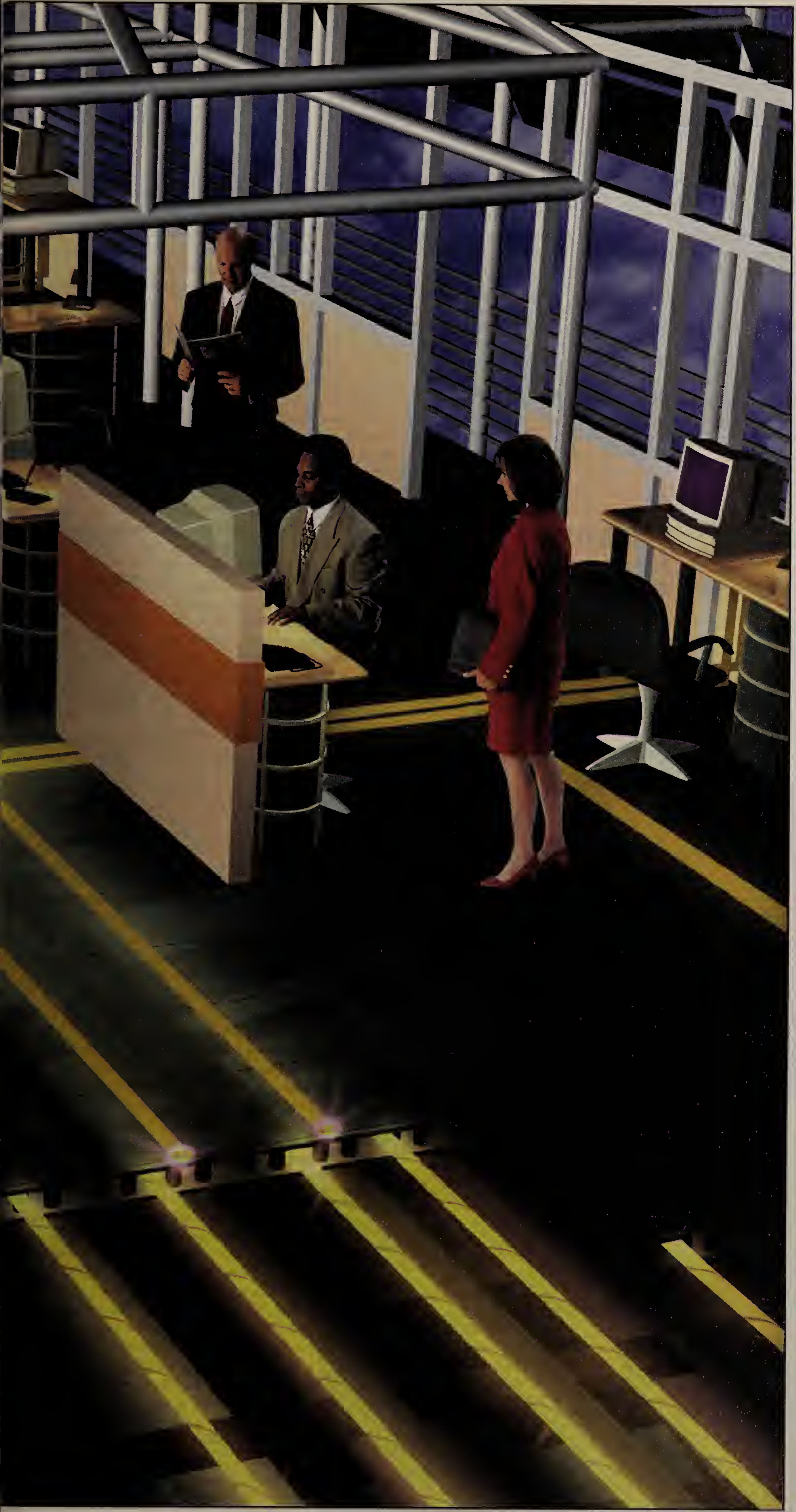

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WAN MONITOR

ATM's short-lived standards

If you think butterflies have short life spans, take a look at ATM standards. They morph so quickly, it's hard for those in the ATM Forum and Internet Engineering Task Force to keep up, let alone us civilians.

For example, do you know the standards themselves don't even use the term "class of service" anymore? You old-timers might remember we started this dance with Classes of Service A, B, C and D. These were later changed to the stunningly intuitive CBR, VBR, ABR and UBR. Later, the VBR service class was split into two subclasses — VBR real time (VBR-RT) and non-real time (VBR-NRT).

We used to have four different adaptation layer specifications (numbered 1 through 4). This was eons ago, at least in ATM half-life measurements. Then we combined adaption layers 3 and 4 into one and called it 3/4 (that's clever), and added a new one called 5. But as it turns out, only one adaption layer (Layer 5) is being used.

A lot of time has been spent defining the B-ICI, and while this standard hasn't changed substantially, the irony here is that there is a big question about whether it will ever be implemented. Private Network-to-Network Interface (PNNI) will probably be used instead.

Frame-based User-Network Interface (FUNI) is another such example. A lot of time has gone into defining this low-speed ATM access, which extends ATM signaling out to the premises while using variable length frames. The only problem is that there aren't any FUNI services and just a few switches support the interface. And don't forget DXI, FUNI's ancestor. DXI has already served its useful purpose, giving up its life to the new generations of ATM that have followed. And I nearly forgot TAXI, but so has the rest of the market.

We shouldn't neglect to mention the standards that address similar problems. A good example of this is how to handle the transport of routing protocols over ATM. You've got a lot of choices here. Classical IP over ATM (RFC 1577) is the old-timer, nearing its third birthday. (Actually, RFC 1483 was the first, but it's already outdated and no longer implemented.) Multiprotocol over ATM (MPOA) and its sibling LAN Emulation (LANE) are the newest kids on the block. LANE addresses IP transport within a single subnet (through smart bridging, not routing), while MPOA builds on the functionality for multiple subnets.

Daniel Briere and Christine Heckart

There have been many promises surrounding ATM, but no one ever promised it would be simple! All of this modification may seem like ATM is really an alias for the Engineers Full Employment Act! Many would joke it's also a good example of what can happen if you let a group of them loose without supervision. But seriously (and before we start getting hate E-mails), ATM is the single most complicated protocol to be developed in this industry, ever. And it's being done in just a few years, instead of maturing over decades the way IP has done. In addition, it is being defined to work in a LAN, campus backbone or WAN. And lastly, all of this decision making is being done through the primary institution of a democracy: open committee.

Given this, it is really amazing that we have any ATM standards, let alone the several dozen in progress.

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.

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You can hop right on a carrier's local SONET ring

By David Rohde

In all likelihood, your long-distance carrier is yelling from the mountaintops about the wonders of something called Synchronous Optical Network, or SONET.

All the rage in carrier networks, SONET is an advanced technology that offers the promise of rerouting interrupted traffic faster than the blink of an eye.

But if you've ever tried to turn that promise into a service-level guarantee on your long-distance telecommunications contract, you know the problem with that story. Carrier SONET installations are far from complete, and for the most part, they're only as good as the path they traverse.

THE RBOC LINEUP

SONET services available from regional Bell operating companies.

Carrier	Name of service	Comment
Ameritech	SONET Xpress	Carrier has asked FCC to let it use SONET rings for switched transport
Bell Atlantic	IntelliLight Custom SONET Ring Service	Also offers dual wire center service over shared ring
BellSouth	SmartRing	Guaranteed network healing in 2.5 seconds
NYNEX	Enterprise SONET Private Network Service	Users can choose DS-1, DS-3 or OC-3 circuits
Pacific Bell	SONET Ring and Access Service	Bidirectional Line-Switched Rings for 50-millisecond restoral
SBC	ReliaNet	Approved by FCC but not yet commercially offered
US WEST	SHARP Self-Healing Network Services	Offered through Interprise Networking Services

And because of the endless disputes over telecom reform, long-distance carriers today usually can't even offer SONET in the most vulnerable part of a company's WAN — the last mile to your premises.

Yet there is something you can do right now to get SONET into your enterprise network: Buy SONET services directly from the local exchange carrier.

Almost every major local carrier currently offers a service that brings a SONET fiber ring directly into your building and carves out a shared or dedicated high-capacity path back to its central office (CO) — or to your long-distance carrier's point of presence (POP).

These services — with names such as IntelliLight, SmartRing and SONET Xpress — are hidden deep within local carrier tariffs. And given local carriers' obsession with selling analog phone lines and figuring out what to do with Internet users who camp on the network for hours at a time, the high-end SONET services are not well advertised.

Nonetheless, with the apparent exception of SBC Communications, Inc., the regional Bell operating company for the southwestern states, each of the RBOCs has a SONET service ready to go (see graphic). And even SBC earlier this year won approval from the Federal Communications Commission for its new ReliaNet service, which, when launched, will be the latest entry in the SONET sweepstakes.

It's not for everybody

Analysts rush to point out that only a particular set of users should consider SONET services from local carriers.

First, only users in metropolitan areas are even likely to be able to get their hands on SONET services. Most RBOC and other carrier facilities — including essentially all copper facilities — are not SONET-capable.

In their tariffs, all the local carriers specify particular metropolitan areas where their SONET services are available. But take heart — in many cases, these areas include not only downtown locations, but also so-called edge cities — the clusters of closed-in suburban high-rises that have attracted so much business over the past decade.

For example, in the Washington, D.C. metropolitan area, Bell Atlantic Corp.'s IntelliLight services are available in all the major business districts, said Tim Stevens, Bell Atlantic's director of advanced access services in Arlington, Va.

If a particular Washington-area business site is not actually located on a SONET ring, Stevens said, the carrier will consider either special construction to complete the ring or a conventional tail circuit to bring the site onto the ring. But only users with an identifiable need for redundant paths to local or long-distance carrier COs should consider investing in SONET services, according to both analysts and carrier officials.

The typical RBOC SONET service forms a dual path to a CO around a ring architecture, Stevens explained. Bell Atlantic's cost for such a path runs about 20% higher than the cost of leasing a traditional private line of the same bandwidth from the customer premises to the CO.

The upshot? If you have no compelling reason to lease dual-access circuits, stick with a traditional private line and save the 20%, Stevens said. But if you're concerned enough about mission-critical data being knocked out by a circuit failure, the SONET service will save you the expense of paying 100% more for the second circuit, he added.

Because of widespread evangelizing by long-distance carrier officials, many users are under the impression that SONET circuits are actually cheaper than conventional dedicated circuits of the same bandwidth, but that can be misleading.

Once installed, SONET does give some carriers an overall cost advantage they can potentially pass back to users, said Tom Jenkins, a broadband consultant with TeleChoice, Inc., a consulting firm in Verona, N.J. "Since the network automatically reroutes, [carriers] do not have to concern themselves with reprovisioning and network downtime," Jenkins said.

But that advantage only appears in point-to-point long-distance traffic covering hundreds of miles, according to Stevens. In the local exchange, the cost advantage is more than wiped out by the extra fiber installation and network equipment required to route every user's traffic in two directions.

In addition, in the local exchange the economics of SONET do not always work well for users that only need T-1 capacity rather than T-3 (45M bit/sec) or OC-3 (155M bit/sec) circuits, Jenkins added.

BLSR TAKES RESTORATION CAKE

BiDirectional Line-Switched Rings offer the greatest assurance of rapid restoral of network outages.

Although the actual mileage charges for carving out a T-1 path over a much higher capacity SONET ring can be very small, Jenkins said, "they could be charging $10,000 for connection to the [SONET] ring."

Even though your RBOC representative may not mention such a service to you, it may be available in your area. Some of the RBOCs originally began provisioning SONET as a method of transporting high volumes of traffic between their COs and long-distance carrier POPs, with no thought of bringing the service down to customer premises, Stevens said. As a result, the services are often housed within RBOCs' carrier services marketing organizations rather than end-user marketing organizations.

If you're concerned enough about mission-critical data being knocked out by a circuit failure, the SONET service will save you the expense of paying 100% more for the second circuit.

All SONET is not the same

You still should have a number of questions to ask if you and your RBOC representative begin crunching some numbers on a SONET service.

Keep in mind that the actual method for rerouting traffic comes in two principal flavors: UniDirectional Path-Switched Rings (UPSR) and Bidirectional Line-Switched Rings (BLSR).

Under UPSR, a ring is established between your premises and the traffic's destination, such as the carrier CO or a series of other customer premises. But the traffic only flows in one direction; the destination of each data packet is simply captured by its IP address or other information.

Then, if there is a cut in one of the fibers on the ring, an alternate path around the ring is selected for the traffic in aggregate. But there is no assurance that any particular user's traffic, or line, is rerouted instantly because all the users employ shared transmission capacity around the ring rather than a specific dedicated segment.

Under BLSR, the traffic flows in both directions, simultaneously in some cases. For example, in BellSouth Corp.'s Smart-Ring service, user traffic is sent out in two simultaneous DS-3 signals, with the best of the two optical signals — one traveling clockwise, the other counterclockwise — delivered at designated locations.

And under BLSR's line switching, each user's traffic is specifically rerouted in case of a fiber failure.

BLSR has been taken to its logical extreme not by an RBOC, but by a long-distance carrier. Sprint Corp. has been hard at work installing four fiber BLSR long-distance rings since 1994. And through its Broadband Metropolitan Area Network program, Sprint is pushing local carriers to employ BLSR technology and ultimately interconnect such rings with Sprint's in an end-to-end offering (*NW*, Sept. 2, page 1).

In addition, AT&T is collaborating with both RBOCs and fiber-heavy competitive access providers (CAP) such as MFS Communications Company, Inc. to provide an end-to-end fiber service called Accu-Ring.

But because AT&T's long-distance network is only getting started with SONET, even Accu-Ring access to the long-distance network doesn't yet provide end-to-end SONET restoral guarantees across the continent.

So users that insist on redundancy and reliability must continue to seek out the right combination of carriers — RBOC, CAP and long distance — to make their enterprise networks as free of downtime as conceivably possible. ■

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Briefs

Ornet Data Communication Technologies, Inc. *last week at NetWorld+Interop 96 bolstered its product portfolio with two switches that support* **Fast Ethernet and ATM** *uplinks. The LANbooster 3600 workgroup switch can be configured several ways, providing 12 or 24 switched Ethernet ports, along with Fast Ethernet or ATM uplinks.*

The LANbooster 5600 backbone switch can be configured 10 different ways, supporting diverse Ethernet, Fast Ethernet and ATM combinations.

The 3600 configured with 12 Ethernet ports and one Fast Ethernet port is priced at $3,295. The 5600 configured with 24 Ethernet and five 100M bit/sec ports costs $8,995. The switches are available now, but ATM uplinks will not ship until the first quarter of 1997.

Ornet: (800) 808-6638.

Whitetree, Inc. *last week rolled out two* **ATM modules** *for the company's existing line of ATM and Ethernet workgroup switches. The modules include a 155M bit/sec ATM card with a single-mode fiber interface and another 155M bit/sec ATM card with an unshielded twisted-pair copper interface. Pricing for the ATM fiber module is $3,995; the copper card is $1,395. Both are available now.*

Whitetree: (415) 855-0855.

Intel Corp. *this week will introduce* **help desk software** *that lets support personnel remotely access a user's PC to diagnose and correct problems. When a user submits a service request, (via the phone or a Web browser), LANDesk Support Center links the user's PC with a trouble ticket that is forwarded to a support person. By clicking on the trouble ticket support personnel can then access the user's PC. LANDesk Support Center will be available at the end of the month for about $3,000.*

Intel: (800) 538-3373.

3Com airs Web-based management software

Applications ease monitoring, configuring of net devices.

By Jodi Cohen

Atlanta

3Com Corp. last week rolled out a suite of Web-based software that allows customers to more easily monitor and configure hubs, switches and other network devices.

The Transcend Web-based applications, an interface to 3Com's existing Transcend Enterprise Manager for Unix or Windows, will enable net administrators equipped with a Web browser to configure 3Com network devices, monitor the net, create intuitive status reports and view net statistics from any location. The software was introduced at NetWorld+Interop 96 here.

"Web management is easier to use than command-line interfaces," according to Frank Fuller, director of systems marketing at 3Com. "It's geographically independent and can be used from any PC or workstation with a browser to access network information."

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The convenience of Web management appeals to one 3Com customer.

"At least I won't have to load specialized client software on my laptop anymore," said David Balding, network design engineer at Computer Sciences Corp., an information technology services firm in Fort Worth, Texas. "Now I can actually access the network from home, which makes things easier for me."

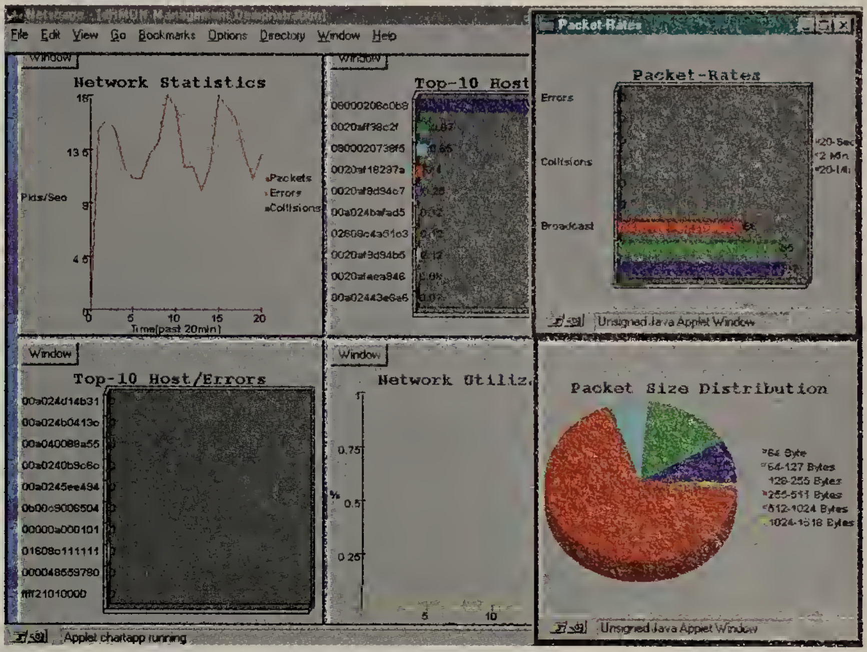
The Web-based tools are designed for both enterprise and small-office markets. Within the enterprise, 3Com will offer an external server to provide Web-based access to network devices.

For the small-office environment, 3Com will embed Web server technology into its network devices, giving net administrators with Web browsers direct access to management information about these devices. Customers will need a Java-enabled browser to take advantage of the applications. 3Com will roll out Web management for its entire product line starting in the fourth quarter, but pricing has not yet been set.

Providing remote control

In addition, 3Com bolstered its line of management products designed specifically for remote and small-office users.

The company unveiled 3Access, software that simplifies management, installation and use of remote desktops. The software, which can run on remote PCs and help desk personnel desktops, lets a remote user alert MIS of the need for assistance and allows help desk representatives to remotely access and troubleshoot the user's PC.



The Transcend *Web-based management application provides geographically dispersed, multiuser access to management functions and information via the Internet.*

3Access is designed for customers using 3Com's AccessBuilder 2000, 4000 and 5000 remote access devices and the AccessBuilder 4000i module for the ONcore switching hub. 3Access, which is available now, is included with all new equipment purchases, but current customers can purchase the software upgrade for $495.

3Com also rolled out two server software upgrades for its AccessBuilder products: DHCP ProxyClient and Windows NT Trap Manager. The DHCP ProxyClient allows net managers to more efficiently track the use of IP addresses as remote users dial into the network. The Windows NT Trap Manager lets net administrators better monitor network resource allocation, costs and utilization by tracking remote access events such as accounting or alarms.

The server upgrade, which is available now, is priced at $495.

©3Com: (800) 638-3266.

Network servers

Motorola, Apple rev up PowerPC servers

By John Robinson and Kristi Essick

Motorola, Inc. last week tried to pump new life into its PowerPC-based product line with new servers and workstations optimized to run Windows NT.

The PowerStack II Net4000 and Net6000 workgroup servers feature the company's recently announced 200-MHz or 166-MHz PowerPC 604e processors, which boast twice as much on-chip cache as the previous chip version and are designed to run a variety of applications.

The Net4000 runs Windows NT 4.0 or AIX, and features 32M bytes of ECC memory and a 2G-byte fast/wide SCSI hard drive. Windows NT comes pre-installed on the Net6000, which is available with one or two PowerPC 604e microprocessors and 2G- or 4G-byte fast/wide SCSI-2 hard drives.

The company is hoping to attract customers with a five-year warranty on all PowerStack products. Both servers will be available in October. Pricing has not been set.

Apple picking

Separately, Apple Computer, Inc. will deliver on a long-held promise to bring a new line of servers to market, powered with up to 200-MHz PowerPC 604e microprocessors.

The Apple machines — the MacOS-based Workgroup Server 8550/200 and 7250/120, and the AIX-based Network Server 700/200 — use the fastest processors available from Apple as well as new server components, such as CD-ROM and 8 mm tape drives.

Apple's Network Server 700/200 *builds on the Model 700, shown here.*

Network Server 700/200 will be powered by a 200-MHz 604e PowerPC processor and enhanced with a 3.5-inch fast/wide SCSI-2 9G-byte disk drive, an 8 mm tape drive (20G bytes uncompressed/40G bytes compressed), an 8x-speed CD-ROM drive and a PCI FDDI card. Apple said it has certified Oracle Corp.'s Universal Server to run on the server. Symmetric multiprocessing capabilities are expected to be

See PowerPC, *page 34*

WIRED WINDOWS

Microsoft arms itself for directory services fight

The "new" Novell came out swinging last week. On Monday morning, I opened up *USA Today* to a full-page Novell ad challenging Microsoft to a directory services shoot-out: Novell Directory Services vs. Microsoft's Domain Services.

Dave Kearns

Microsoft, however, has delivered some good news in the directory services area, putting a free beta version of its Distributed File System (DFS) for Windows NT 4.0 on its Web site (www.microsoft.com/) earlier this month.

PC network administrators have long envied Unix's file system capabilities, especially the ability to link a file or directory to another. That is, a single file or directory could be made to appear in multiple places, depending on your needs.

NetWare administrators, for one group, have been asking for this ability for at least the past seven years, with only vague promises from Novell about including it in some future version of the network operating system (NOS).

Windows users got a taste of the possibilities with Windows 95's ability to create links to files. Now DFS goes even further.

Microsoft said DFS is a utility that allows for the organization of file servers and shares into one directory, making it easier for users to browse, search for and access data on the network. The system allows data to appear in the most logical place in the directory tree, no matter what file server it is on.

A network manager can change the network by moving data and adding extra resources, such as file storage, without affecting the way users access the data.

The beta version supports NT 4.0 and Windows 95 clients. There was no word as to whether other NT 4.0 clients would eventually gain the ability to use the system.

The possibilities are endless for giving users customized views of the network file system, even customizing for each individual user. Rather than multiple shares and/or drive letters, each user's file and folder resources can be organized as a single tree. This should result in less confusion for nonsophisticated users as well as better protection against more sophisticated users. Count this as a major plus for Microsoft in the NOS battle.

NT Server vs. NT Workstation

Separately, here's the latest installment of the Microsoft vs. Netscape melodrama about whether customers should be able to run their Web servers on NT Workstation rather than the more expensive NT Server. Microsoft took it on the chin when Andrew Schulman, senior editor at Web software vendor O'Reilly & Associates, Inc. and author of *Unauthorized Windows 95,* revealed there are minimal technical differences between NT Workstation and NT Server. Schulman showed the products have identical kernels; in fact, NT is a single operating system with two modes. Only two registry settings are needed to switch between these two modes in NT 4.0, and only one setting in NT 3.51. This lent great support to Netscape's view that the limit of 10 concurrent TCP/IP sessions for NT Workstation were arbitrary and unreasonable.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.

Tip of the week

If you're an E-mail packrat but have difficulty locating the exact message you need when you need it, InfoSolutions, Inc. has teamed up with Folio Corp. to help you out. E-mailbag works with most E-mail systems and features Folio's proven search engine and compression technology. Get more information from info@infosolutions.com. Pricing starts at less than $30 per user.

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What Are ATM Forum Signalling Standards All About?

By Rob Rennison

Current ATM Forum signalling specifications provide procedures for dynamically establishing and clearing ATM connections. They can be grouped into User-to-Network signalling standards (UNI 3.0, UNI 3.1, and UNI 4.0) and Network-to-Network signalling standards (IISP and PNNI 1.0).

UNI 3.0 was based on the ITU interim Q.93B standard. When Q.93B was ratified to become Q.2931, the Forum released UNI 3.1, based on Q.2931. One of the key differences between Q.2931 and Q.93B is that they both require different and incompatible versions of the data link layer protocol (SSCOP) .

As a result, UNI 3.0 and 3.1 devices cannot be directly attached. For example, a UNI 3.0 adapter cannot be attached to a switch running only UNI 3.1 and a UNI 3.1 adapter cannot be directly connected to a switch running only UNI 3.0.

To ensure that UNI 3.0 devices and UNI 3.1 devices can interoperate with each other, switch vendors must provide both UNI 3.0 and UNI 3.1 signalling, a UNI 3.0 to UNI 3.1 interworking function and autodetection. Autodetection of the UNI version enhances interoperability, preventing configuration conflicts between switches and adapters.

UNI 4.0 signalling provides additional capabilities beyond 3.x including: signalling of individual QoS parameters such as Cell Transfer Delay and Cell Delay Variation requirements.

UNI 4.0 also allows the signalling of new service capabilities defined in the Traffic Management 4.0 specification, such as the ABR and real time VBR service capabilities.

The IISP is an interim standard enabling equipment from different switch vendors to interoperate until implementations of ATM Forum PNNI signalling are readily available. Since no route propagation is possible over an IISP interface, static routes must be manually configured on both sides of the link.

PNNI signalling 1.0 is based on the UNI 4.0 protocol and provides mechanisms to signal over links which support the ATM Forum PNNI routing protocol. Additional capabilities include: source routing information, efficient rerouting of failed calls, and standards-based signalling for Soft Permanent Virtual Circuits and Paths.

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Servers

HP serves up new NetServer

By Rebecca Sykes

Hewlett-Packard Co. has introduced its NetServer E Series of PC servers aimed at small and midsize businesses that have little or no MIS support to call on.

HP's first E Series system, called the NetServer E30, will begin shipping next week for Novell, Inc.'s NetWare and Microsoft Corp.'s Windows NT operating systems, according to Duncan Campbell, worldwide marketing manager for HP's Network Server Division.

Installation features include a guided network operating system installation package, a preinstalled network interface card and a bootable CD-ROM drive, according to Campbell.

HP's NetServer *E30 is aimed at smaller businesses that have little or no MIS support.*

In addition, he said NetServer E Series PCs will ship with Autopilot software, which monitors hard drive capacity, hard drive quality and storage connections.

NetServer E30 prices range from $1,907 for a PC with a 133-MHz processor, 16M bytes of memory and no hard disk drive to $2,681 for one with a 166-MHz processor, 16M bytes of memory and a 2G-byte hard drive.

Contact HP at (415) 857-1501.

Sykes is a correspondent at IDG News Service's Boston bureau.

PowerPC

Continued from page 33

added in early 1997.

The server will be available in October with prices starting at $16,129.

For existing Network Server 500/132 and Network Server 700/150 customers, a 200-MHz CPU upgrade card will be available in November for $1,609. Introduced in February of this year, the Network Servers were designed for the publishing, enterprise, entertainment and education industries.

The Workgroup Server 8550/200, also available in October, will feature the 200-MHz PowerPC 604e chip. The server, which will cost between $5,799 and $7,399 depending on the configuration, includes an 8x CD-ROM drive.

Apple is also releasing a lower cost 120-MHz processor-based workgroup server, the 7250/120, with prices starting at $2,689.

The servers come with updated versions of software application packages, enabling them to be used as application, Internet or AppleShare file and print servers.

For more information, contact Apple at (408) 996-1010.

Essick is a correspondent at IDG News Service's Boston bureau.

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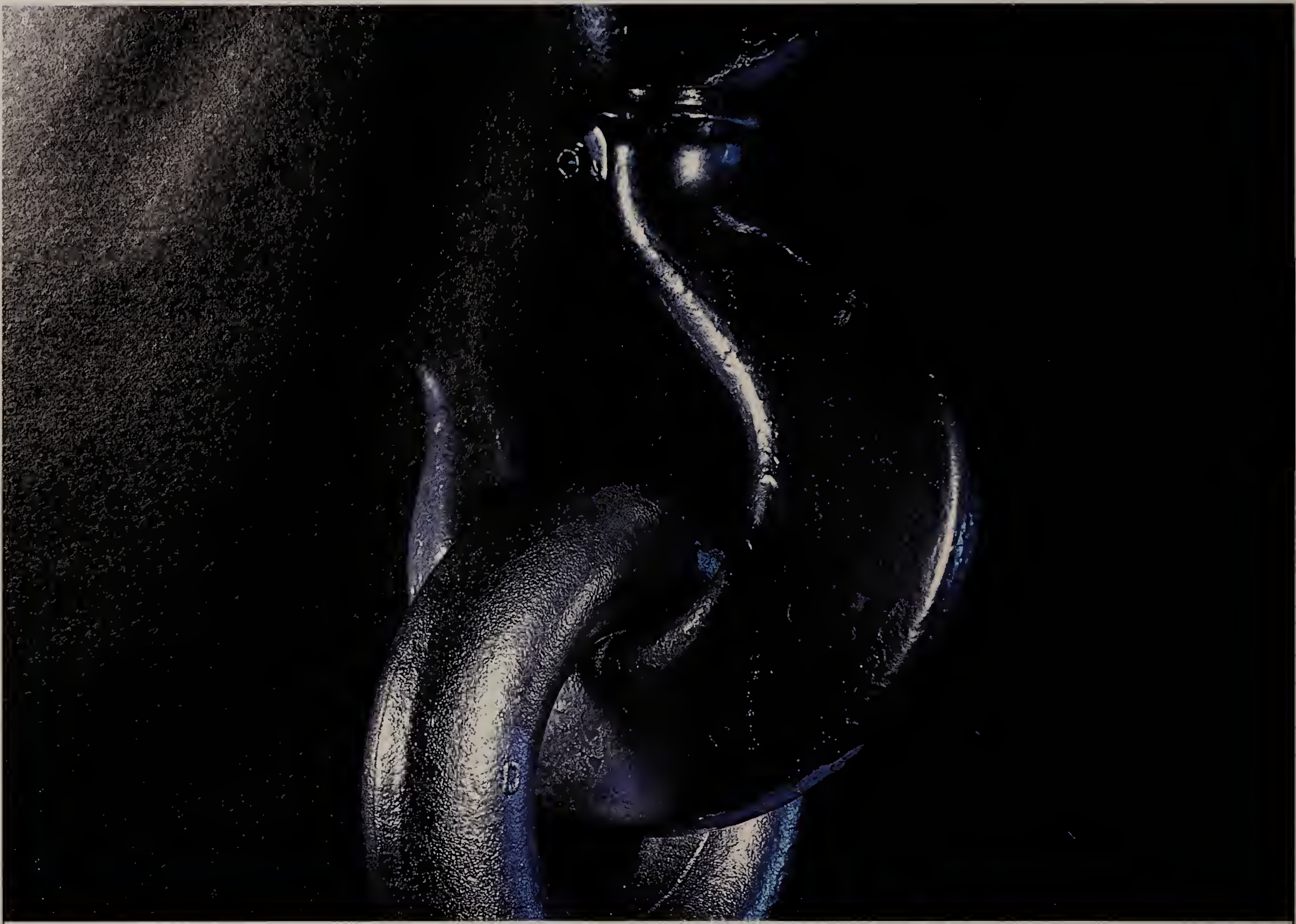

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Client/Server Applications

Covering: Databases • Messaging • Groupware
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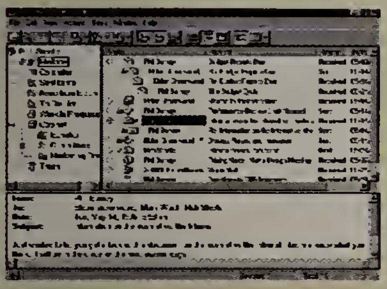
Briefs

■ **Novell, Inc.** *in Orem, Utah, plans a* **GroupWise 5.0** *update next year that will enable users to publish document libraries and do full-text searching on the Web. The project, code-named Jefferson, will extend GroupWise's library system to the Internet and intranets, and is expected in the first quarter of next year. Pricing was not available.*

Novell: (801) 429-7000.



GroupWise 5.0 *to be enhanced.*

■ **Critical Angle, Inc.** *in Austin, Texas, has begun beta-testing* **X.500 Enabler,** *software for connecting Lightweight Directory Access Protocol-based servers to servers based on X.500 directories. X.500 Enabler will ship next month on Unix and Windows NT. Pricing is $495 per host system.*

Critical Angle: (512) 305-0286.

■ **Verity, Inc.** *in Sunnyvale, Calif., is beta-testing software for building Web-enabled enterprise* **search applications.** *Search Information Server will let users meld diverse information sources, including desktop applications, groupware and corporate databases, into a single searchable information store.*

It will also include a component that extends the search capabilities to Web-based information. A still-in-development Agent Server will let users deploy agents that monitor information across applications, the 'Net and real-time newsfeeds.

Separately, the company announced Search Personal for Microsoft Exchange, an application that utilizes the Exchange client to search mail messages and more. Pricing for the new products was not available.

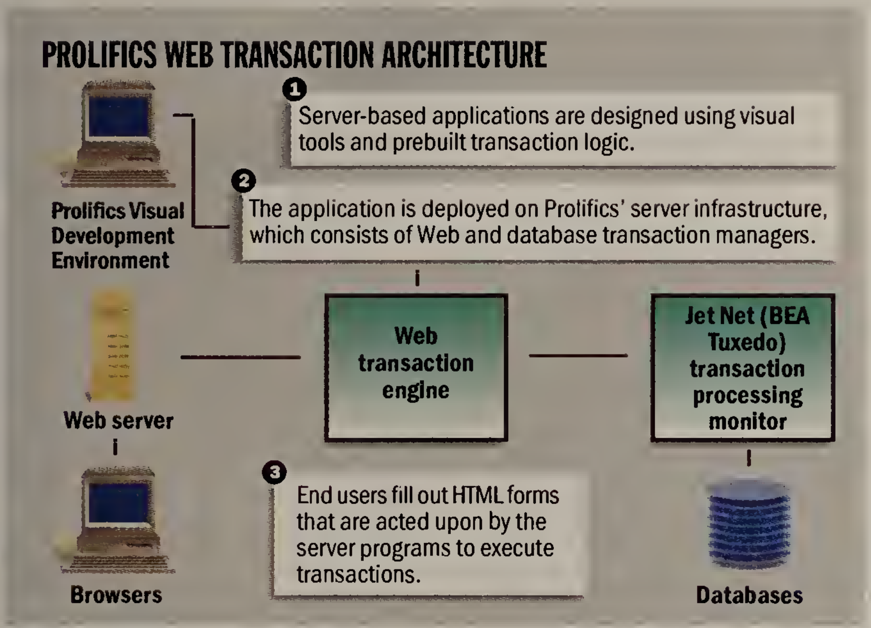
Verity: (408) 541-1500.

Vendors take action on Web transactions

By John Cox

A new breed of tool is opening the door for Web browser users to perform transactions — that is, to update or change corporate data on back-end systems instead of being able to only read it.

The new tools — one announced this week by Jyacc, Inc. spin-off Prolifics and another announced earlier this month by Kiva Software Corp. — take similar approaches: an interface to the Web server, transaction support and middleware in a separate application server, and a graphical tool set for building and deploying server-based application logic.



PROLIFICS WEB TRANSACTION ARCHITECTURE

❶ Server-based applications are designed using visual tools and prebuilt transaction logic.

❷ The application is deployed on Prolifics' server infrastructure, which consists of Web and database transaction managers.

❸ End users fill out HTML forms that are acted upon by the server programs to execute transactions.

Prolifics Visual Development Environment
Web server
Browsers
Web transaction engine
Jet Net (BEA Tuxedo) transaction processing monitor
Databases

But there are important differences between them.

Prolifics relies heavily on parts of existing products — Jyacc's Jam fourth-generation language development tools with extensions for transactions and a repository to store reusable components and a fully integrated copy of BEA Systems, Inc.'s Tuxedo transaction processing (TP) system and middleware.

Kiva relies on C/C++ and Java (and soon Visual Basic) for server application development. It uses third-party client/server development tools and HTML authoring tools for the client graphical user interfaces.

A tool kit called Kiva Endeavor provides wizards and class libraries to interconnect client displays with server-based code.

Kiva has built its own transaction features into the Kiva Enterprise Server; the initial product release will support only Microsoft Corp.'s Open Database Connectivity interface to relational databases.

Neither product is quite ready for full Web deployment. Prolifics is releasing components that will support traditional client/server applications, with Windows PCs as clients. The visual tool set and the Transaction Engine are available now; a five-developer license starts at $35,000. The component to link this with Web servers is due out in the next few months.

Kiva's software is in final beta and is due for release by year-end. Pricing will be announced at that time.

Neither company's product yet works with the extensive existing inventory of host-based transaction applications or business logic. Users must write new applications or rewrite existing ones for deployment on either platform.

Few companies today are doing Internet-based transactions, and those that are typically create separate systems, completely cut off from existing corporate TP systems, said Jim Johnson, chairman of The Standish Group International, Inc., a Dennis, Mass., technology research company.

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That will change, according to Gartner Group, Inc. in Stamford, Conn., which estimates that 30% of enterprise TP applications will interact in some way with the public Internet by the end of 1999.

©Prolifics: (212) 267-7722; Kiva: (415) 526-3900.

Groupware

Microsoft expands collaboration features in its Office97 suite

By Christine Burns and Barb Cole

Microsoft Corp. officials have revealed further details about features in the upcoming release of the Office97 suite, which are expected to simplify user collaboration through integration with Exchange Server.

Microsoft announced earlier this summer that Outlook, a desktop information management tool and advanced E-mail client, would join new versions of both Word and Excel to comprise Office97 when the product ships early next year.

Microsoft Exchange users will receive Outlook free in the box with Version 4.5, by year-end.

This is the first time Microsoft has detailed the features of Outlook that will allow users to create customized groupware applications powered by Exchange Server at the back end.

Lani Ota, an Office97 product manager, said custom forms, contact lists and Microsoft Word and Excel documents can be created by users from within Outlook and then stored in public folders on an Exchange Server where all workgroup members have access.

Through a customized Outlook view configured by each user at the desktop, changes can be made to the centrally stored Office and Excel documents. Those changes can then be tracked by all members of the workgroup using Outlook's built-in editing tools.

"We can build workflow around this," said Kevin Lee, senior LAN engineer at Nike, Inc. in Beaverton, Ore. "It's very important because right now [Microsoft] has nothing except basic electronic forms to rival Notes."

Outlook users can also easily access the workgroup forms and automatically forward them to the appropriate user or department using information from a shared contact list stored on the Exchange server.

Additionally, the Outlook/Exchange collaboration allows users to participate in structured online conversations throughout an intranet, much like the public forums enabled by the Internet.

SHARING IN OFFICE97

Microsoft engineers have doubled the amount of code shared among Office97 applications vs. the common code shipped in Office95. Since almost half of the lines of code in the new suite are shared by Outlook, Excel and Word, desktop overhead is significantly decreased and collaboration between the application is simplified.

"When groups of users start an online discussion using Outlook and Exchange Server, what that becomes is a thread to bring all of the other Office applications into that same collaborative environment," said John Dunkle, president of Workgroup Strategic Services, Inc. in Portsmouth, N.H.

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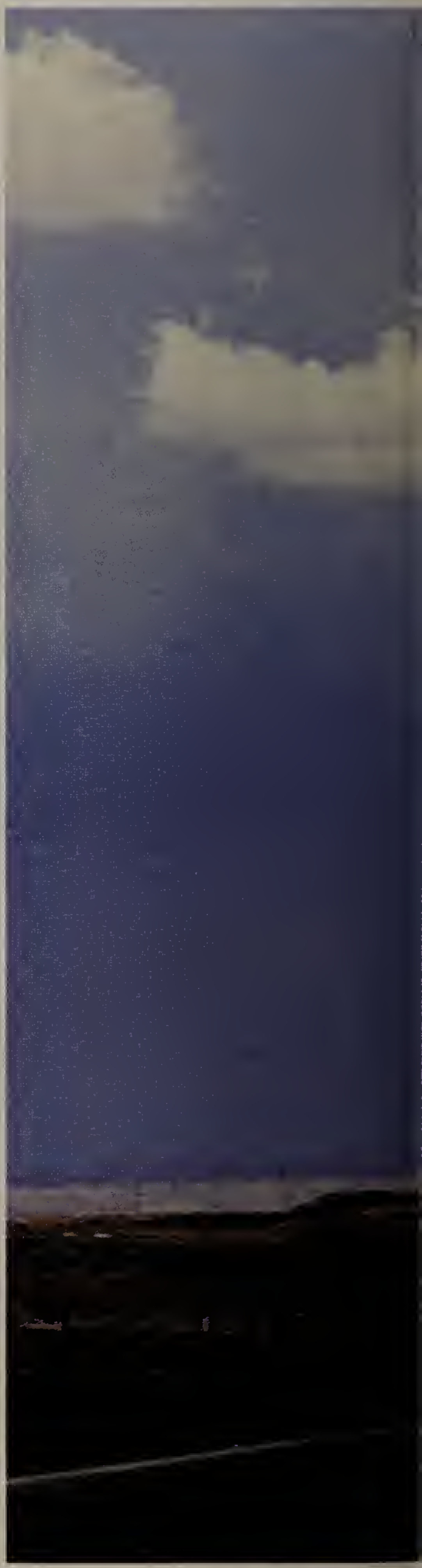

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SHARED LOGIC

Waiting for continuous process improvement

I was prepared for the worst in attending the Software Engineering Institute's (SEI) yearly conference earlier this month in Pittsburgh, but I came away pleasantly surprised.

SEI is based at Carnegie Mellon University and has taken on the noble task of "transitioning the best of the state of the art in software engineering into common practice" for its customers. The group is federally funded and sponsored by the U.S. Department of Defense.

Reading through the selected SEI papers that were given to participants at the show, I was impressed by the proliferation of advanced software architectures that are included, many of which are specific to particular network applications. For example, four options for a Workflow Architecture are proposed, two of which are based on the Object Management Group's Common Object Request Broker Architecture.

But what most of the papers have in common is an emphasis on the development of component-based applications. Component-based development involves building applications comprising integrated components taken right off the shelf — either commercial products or recycled components from other applications.

While this sounds good, in practice it gets a bit more complicated. That's what most of the selected SEI papers deal with: the practical implications of component-based development. It's good reading if you're interested in what the heavy thinkers are contemplating for the future of software engineering. What's best about it is that they obviously were careful to include only those papers that can be easily digested by anyone with a standard technical management background.

Marc Myers

One of the most positive things about the conference was that the level of hype was low. Having been in the commercial software sector for 14 years, I've come to expect to get hyped and hustled every step of the way. But SEI maintains its Carnegie Mellon roots, along with its collegiate attitude of frank and honest discussion in a noncommercial setting.

Of course, conversation at the show still often turned to heavy topics such as the SEI's Capability Maturity Model (CMM), a software development model that was written five years ago and is starting to gain popularity even outside the public sector.

The CMM has now reached such a level of formality you can find consulting firms that specialize in guiding organizations through the maturity levels and in performing maturity audits. Organizations are graded according to which level they have reached, where 1 is the initial level and 5 is the most mature. It was considered very sexy at the SEI show to have achieved Level 3 and above.

Many organizations mentioned they had upcoming audits to contend with and were eagerly seeking any information that could help them in preparation for the test.

What's appealing about CMM levels is they provide the most specific and sensible criteria I have ever seen for analyzing and evaluating the capabilities of a software development team. As tools mature that respond appropriately to the conclusions reached by the CMM Auditor, the theoretically sound, but practically impossible, idea of continuing process improvement can begin.

Myers is CEO of Client/Server Connection, Ltd., a New York-based software development company. He can be reached via the Internet at mmyers@cscl.com.

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Intranets & the 'Net

Covering: Internet Technologies and Services for Collaboration and Electronic Commerce

Briefs

■ **Microsoft Corp.** *recently hosted a forum for 150 security vendors and end-user companies, including Citibank, N.A. and Wells Fargo & Co., to detail Microsoft's Internet Security Framework based on its set of Crypto APIs.*

Keith Szot, Microsoft lead product manager for **Internet security,** *said Crypto API 2.0 is now in beta on Microsoft's Web site so Web software developers can use it.*

Crypto API 1.0 provided simple key generation and encryption functions, while Version 2.0 adds the ability to do certificate management, storage and parsing.

■ **Racal-Datacom, Inc.** *plans to begin shipping next month the Racal TrustMe Authentication Server, a token-based* **access control** *server supporting the Radius and Tacacs authentication and authorization services. Based on Windows NT, Racal TrustMe, available on CD-ROM, starts at $1,695 for 50 users.*

Racal-Datacom: (954) 846-1601.

■ **Enterprise Systems Management Corp.** *this week begins shipping an* **intranet management** *product called UNameIt Version 2.0, a central respository for resource definitions of networks, services and users on the corporate intranet. UNameIt starts at $25,000 to manage 1,000 hosts and 500 users.*

Enterprise Systems Management: (714) 505-7686.

■ **NetPartners Internet Solutions, Inc.** *last week unveiled WebSense, Internet* **content-screening** *software that lets corporations define 'Net access privileges for employees by screening out inappropriate Web sites.*

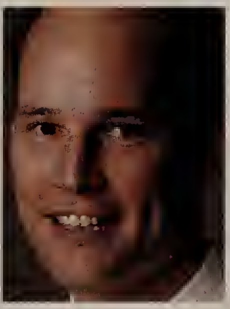
NetPartners Internet Solutions: (619) 505-3020.

Big city paper gets scoop on 'Net hard realities

By Ellen Messmer

Arlington, Va.

It's been just over two months since the *Washington Post* put its entire daily newspaper on the Web for free viewing, and the paper has already gotten the scoop on the Internet's harsh realities.



Digital Ink's *George says, "Our Web site is like a press: Our press must continue running 24 hours a day, seven days a week."*

Operated by the *Post's* Digital Ink Co. subsidiary of 70 editors and technical staff, the Web site washingtonpost.com quickly gained popularity. One million readers each week browse what is now 65,000 Web pages of content based on the print version, along with breaking news, updates, newsgroups and online information packages.

But the bad news is the *Washington Post* now hears a never-ebbing flow of complaints. Web users everywhere are calling the *Post's* 800 number or sending E-mail asking why the newspaper cannot fix the Web's slowness, the Internet service outages and problems with Web browsers.

"The Internet isn't a place you can guarantee a reliable experience," said Mike George, Digital Ink's vice president of technology. "Readers don't necessarily know what the Internet is. The instant something goes wrong, the whole world notifies us."

Laying the blame

The *Washington Post* is relying on Web hosting services from three outsourcing providers to manage its public HTML servers, but Digital Ink is dissatisifed enough with all three to consider bringing the Web servers in-house and adding T-1 access.

MCI Communications Corp. hosts the *Washington Post* Web server for news content at a location in nearby Pentagon City. The IBM Global Network is hosting the server for the *Post's* online recruitment ads in Schaumburg, Ill. And Digital Equipment Corp. is hosting a third server for politicsnow.com, the domain name for a joint venture between the *Post*, ABC News and the National Journal in Palo Alto, Calif. The venture was launched in February.

Link to other online newspapers.

Type the number to the right in the DocFinder box on the home page.

9301

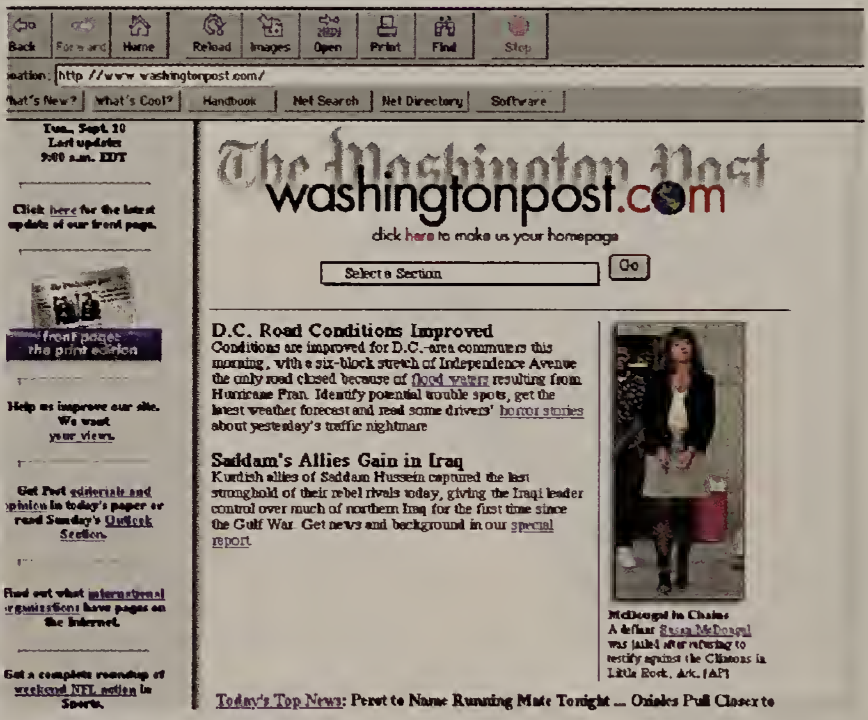
NetworkWorld Fusion http://www.nwfusion.com

"They're not always responsive," said George about all three Web hosting services. "They're all learning how to do the business."

Evans Witt, executive editor of the Politics Now venture, located in the same building as Digital Ink, said a UUNET Technologies, Inc. outage the week of the Democratic Convention injected havoc into the Web-based news services.

"At least UUNET publishes

See **Washington Post,** ***page 44***



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D.C. Road Conditions Improved

Conditions are improved for D.C.-area commuters this morning, with a six-block stretch of Independence Avenue the only road closed because of flood waters resulting from Hurricane Fran. Identify potential trouble spots, get the latest weather forecast and read some drivers' horror stories about yesterday's traffic nightmare

Saddam's Allies Gain in Iraq

Kurdish allies of Saddam Hussein captured the last stronghold of their rebel rivals today, giving the Iraqi leader control over much of northern Iraq for the first time since the Gulf War. Get news and background in our special report

McDougal in Chains

A defiant Susan McDougal was jailed after refusing to testify against the Clintons in Little Rock, Ark. (AP)

Today's Top News: Perot to Name Running Mate Tonight ... Orioles Pull Closer to

The Washington Post *Web site gets one million readers per week.*

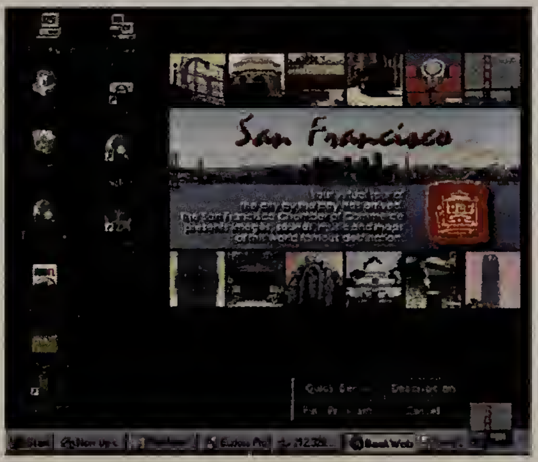
BackWeb puts custom Web foot forward

By Carol Sliwa

San Jose, Calif.

Most Web site administrators today sit back and wait for surfers to find the posted information on their own. BackWeb Technologies claims it has a better way: technology that delivers personalized Web content to customers.

Using BackWeb's scripting language, companies can create animated multimedia presentations, called InfoPaks, that can be sent out to customers as screen savers, wallpaper or information flashes that pop up on their screens.



BackWeb Technologies *last week unveiled a client/server software package that will enable companies to deliver personalized Web content to their customers.*

BackWeb server software allows the companies to store and transmit the content they have created for their Internet "channel," and server console software helps them manage the system.

Users visiting the company's Web site will be given a chance to set up a personalized subscription, whereby they can indicate the type of information they want to receive and when they want to view it. They will need BackWeb client software, which they can download free from BackWeb's Web site (www.backweb.com).

Utilizing the User Datagram Protocol, so-called "Polite Agent" technology running on the client, senses unused bandwidth. It then downloads files when users are not actively engaged in their online connections.

The client software is still being tested. A beta version that

See **BackWeb,** ***page 44***

TimeStep embraces 'Net security

New gateways secure LAN and WAN connections.

By Ellen Messmer

Atlanta

TimeStep Corp. has taken the wraps off two security products based on the Internet Protocol Security (IPSEC) standard for encrypting IP packets, becoming one of the first to implement the new IETF standard.

The company's Permit IntraGate hardware/software offering sits behind a WAN router to encrypt traffic destined for remote sites over the Internet at up to T-1 speeds.

The second product, Permit MicroGate, is designed to secure communications onto a LAN segment running at up to 10M bit/sec.

Since both TimeStep products support IPSEC, they can decrypt data received by other products based on the standard, such as encrypting firewalls from

See **TimeStep,** ***page 44***

Washington Post

Continued from page 43

outage reports on its Web site," Witt said. "We don't have standards for the Internet like we do for telecommunications, the Bells and long-distance carriers."

New news process

Post subsidiary Digital Ink transmits the prepared HTML news content and graphics over the public Internet to the MCI and IBM Web hosting services. But the *Washington Post* is planning to move to private lines for speed, reliability and security reasons.

Private lines will cost more money, but it is still a paltry sum next to the millions of dollars the *Washington Post* has already spent on its Web site and staffing.

The *Washington Post* started putting together the editorial and technical operations for its Web news site last year after AT&T pulled the plug on its proprietary online service, Interchange, used by the Post for its subscriber-based news service.

Ads rolling in

So far, advertising is reaching the levels expected by the marketing staff. George said his staff wants to test out Standard Generalized Markup Language and Data Type Definition templates that Oracle Corp. and Informix Software, Inc. are developing. These templates are for filtering content so changes to Web pages, such as shifting the position of ads or content, can be made quickly. "Today we have to reparse the files with HTML editors and possibly wrap new HTML around it," he said. "I want the system to be able to automatically change the look and feel."

Digital Ink, intended from the start to emphasize local news by covering university and county activities, is now preparing four more Web servers for electronic commerce and advertising for local businesses, George said. And eventually, the *Post* will put its archives on the Web, searchable for a fee. ■

TimeStep

Continued from page 43

Raptor Systems, Inc., said TimeStep President Tim Hember. IPSEC will allow trading partners using different vendors' products to share encrypted data.

Permit Microgate *lets corporations secure data traffic between LAN servers.*

Corporations can consider using the Internet for sending critical business data only if the data is being encrypted, Hember said.

Both products can be controlled with TimeStep's Security Network Management System, part of the Permit family.

MicroGate costs $2,295, and IntraGate costs $1,495. Both are expected to ship next month.

©TimeStep: (613) 599-3610.

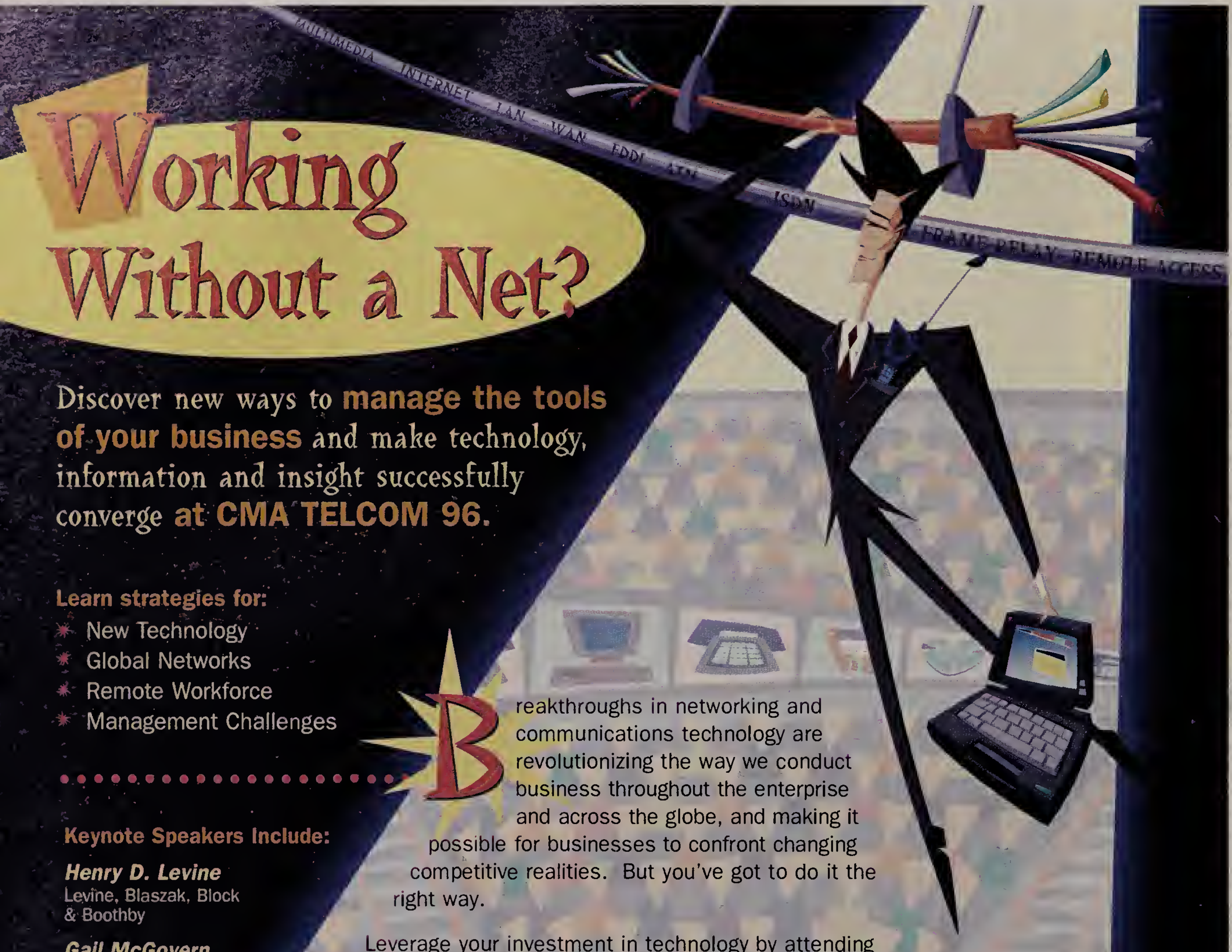
BackWeb

Continued from page 43

runs on Windows 95 is available now, with the final version due by year-end. Beta client software packages for Windows NT 4.0, Windows 3.1 and Macintosh are also expected to be released by the end of the year. The BackWeb server software is available now on Sun Solaris using a Pentium PC or SPARCstation. A Windows NT beta version is expected by year-end.

The BackWeb server software sells for a base price plus a monthly fee that will vary depending on the number of presentations, or InfoPaks, a company distributes. Annual costs can range from $10,500 for low-volume channels to $100,000 for high-volume channels.

©BackWeb: (800) 863-0100.



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Technology Update

Keeping Up with Network Technologies and Standards

When it comes to universal in-boxes, the approach is to unify or integrate

The type of users, PC or phone-centric, will factor into the choice of messaging solution.

By Frank Woo

End users favor almost anything that makes it easier to manage the daily influx of voice mail, E-mail and fax messages, but network managers have to consider some complex technology issues before deciding whether to implement a centralized, universal in-box and messaging solution.

One of the biggest issues network managers have to grapple with is whether it's possible to roll out a centralized messaging solution without losing the investment in current voice mail and E-mail systems.

Many major telecommunications firms and software companies have debuted centralized messaging offerings to address this concern. These vendors provide a variety of solutions — with varying degrees of success — designed to bridge the steadily narrowing gap between traditional voice mail and E-mail systems. The capabilities of both types of messaging systems have expanded with the advent of sound-capable PCs, which support the use of voice in E-mail. The messaging solutions available today consist of various hardware and software configurations intended to bring together these two channels of communication. Organizations that want to implement a next-generation messaging solution have a choice between unified and integrated messaging.

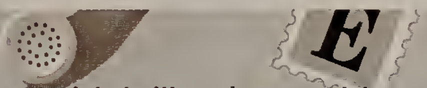
A couple of approaches

Unified messaging solutions differ in how loosely or tightly they join E-mail and voice mail capabilities. A loosely coupled approach involves putting a visual front-end interface to the voice mail system on the desktop and using this software to access the user's voice and electronic mailboxes. Products such as Message Manager and Visit Manager from Lucent Technologies, Inc. and Northern Telecom, Inc., respectively, follow this approach.

In this approach, which unifies messaging, users can launch their voice mail messages from the E-mail interface or their E-mail messages from the voice mail interface. However, loosely coupled configurations do not support integrated access when users are away from the office.

Since the loosely coupled approach does not involve integration at the server level, voice mail cannot be applied to applications other than E-mail. This can be restrictive, but it is easy to implement and inexpensive.

UNIFY OR INTEGRATE?



Here's a look at some pros and cons associated with each approach to providing universal in-boxes.

Loosely coupled unified messaging

Pros

- LAN-attached users can access their E-mail messages via the voice mail interface, and vice versa.
- This is an easy-to-implement, inexpensive solution.

Cons

- Users need disparate voice mail and E-mail interfaces on their PCs.
- Remote users can't retrieve voice mail and E-mail messages through a single interface.
- The voice mail and E-mail systems are not integrated at the server level.

Tightly coupled unified messaging

Pros

- The voice mail and E-mail messages are stored in a single server.
- LAN-attached users can get voice mail and E-mail through one interface.

Cons

- If the message server goes down, users can't retrieve voice mail or E-mail messages.
- The LAN can take performance hits because all messages are played back over it.
- This approach can require an investment in additional equipment and user training.

Integrated messaging

Pros

- This system supports two message servers, one which is attached to the voice mail system and the other to the E-mail servers.
- Users can store voice mail and E-mail messages on either of the servers, and can transfer and copy messages among servers.
- Voice can be integrated into other applications.

Cons

- With large deployment (100 desktops or more), users might experience delays of up to 10 minutes when transferring messages from one server to another.
- Support for integrated messaging is not yet that widespread.

Tightly coupled unified messaging consolidates all voice and E-mail messages into a single mailbox. This means if a user clicks on the E-mail interface, all messages — voice or data — would be delivered to the client. If the PC has multimedia capabilities, the audio player would run the voice message. If the PC cannot run the audio, the phone will ring. In this case, users could still control message playback via their PCs.

This approach may require an extensive investment in new equipment, such as a voice messaging system that works in conjunction with an existing E-mail server. It also may require network redesign and user retraining, especially if the designated messaging interface differs from the user's preferred mode of accessing messages.

Examples of vendor teams providing tightly coupled solutions are Octel Communications Corp. and Microsoft Corp., Novell, Inc. and CallWare Technologies, Inc., and Big Sky Technologies, Inc. and Lotus Development Corp.

Integrated messaging is provided via server-based software that links a user's voice and E-mail boxes through administrator- and user-defined rules. The servers work together to coordinate the storage and playback of messages.

Synchronization of the two mailboxes effectively consolidates incoming voice mail, E-mail and fax messages so recipients can access them from their PC or telephone.

Integrated messaging builds on widely used messaging systems, so organizations may be able to implement it using what they already have in place. In many cases, familiar messaging interfaces stay intact. Lotus, for example, offers integrated messaging software for Notes.

Messaging guidelines

When it comes to picking an integrated messaging platform, informed professionals should evaluate several key criteria. They should determine whether the messaging solution:

- Allows users to communicate in the most comfortable way or forces them to choose one delivery method over another. In other words, does the solution serve as a flexible, single source of messaging information?
- Is easy to use. Does the solution require training, or is it based on applications and technologies with which users are already familiar?
- Takes full advantage of the current investment in messaging technology. Most organizations have already invested significantly in E-mail systems, groupware and a computing and networking infrastructure, as well as a voice messaging system. Of specific interest to technology managers is the way in which any new messaging solution builds upon this foundation.
- Provides an easy way to phase in users. Does the solution require an "everyone or no one" approach to messaging, or can you enable a few users at a time with new capabilities?
- Supports the Common Messaging Call API defined by the X.400 API Association.

In the coming months, information technology professionals can look forward to a slew of products and services that promise to do it all with respect to the universal in-box. The key to making the right decision lies in knowing what your users expect now, what your system can handle today and where you want your network to be tomorrow.

Woo is director of telephony and pager products at Lotus in Cambridge, Mass. Information is available by calling (800) 343-5414 or at www.lotus.com/telephny.

NUTTER'S NETWORK HELP DESK

Network World *tracks down answers to your questions. We're assisted by Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area. Please submit your questions to rnutter@world.std.com.*

How much RAM is needed in a Novell, Inc. NetWare 3.12 file server to mount a volume? I have a mounted volume of 3G bytes online and would like to add an additional 4.3G bytes to my SYS:volume. Is 56M bytes of RAM enough?

Via the Internet

Novell publishes a memory calculation for determining the amount of RAM needed to cache a volume to the server. The rule of thumb I've followed for years is to have 16M bytes of RAM for every 1G byte of mountable disk space in the server.

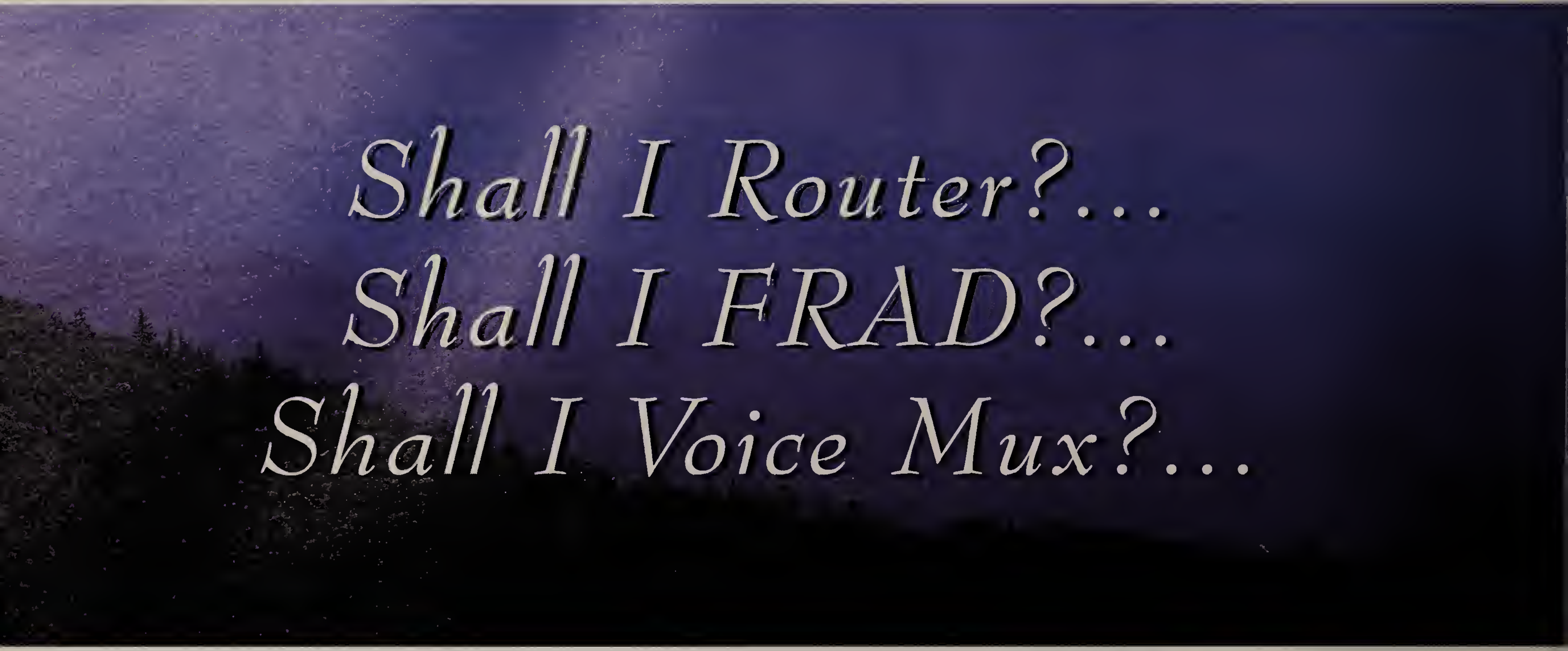
You'll also need to add memory to handle server-based applications. In the current configuration, you'll need to add between 48M and 64M bytes of RAM. However, I don't think it's a good idea to span the current 3G-byte SYS:volume with an additional 4G-byte volume. The disadvantage to spanning a volume across multiple physical drives is you will lose the entire volume if one of the drives in the span set fails.

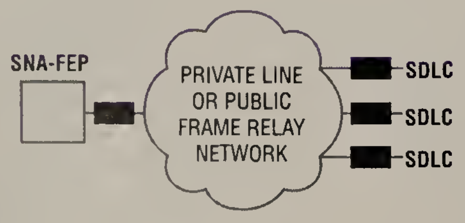
We are planning to expand our existing 1G-byte SYS:volume with a 2G-byte hard disk. We've already done this with NetWare 4.1, but we're not sure if NetWare 3.12 can handle it. What do you think?

Von-Akib Dacudao, network engineer, Dole Asia, Ltd.

It can, but you'll need to add more RAM to properly cache the expanded volume. And I recommend that you configure the additional drive using a different volume name. As I mention above, if you span a volume across multiple physical drives and one drive fails, you'll lose the entire volume. You'll also want to watch for applications that use a DOS call for free drive space. They'll report a negative number for free space when they see a drive in excess of 2G bytes.

It's good to remember that VOLINFO will report the correct amount of total and available disk space and the DIR command will report at most 2G bytes of free space until the volume remaining is less than that.





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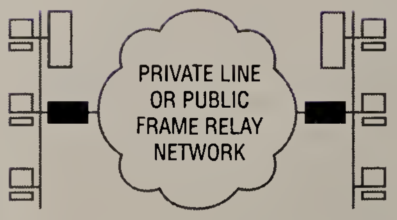
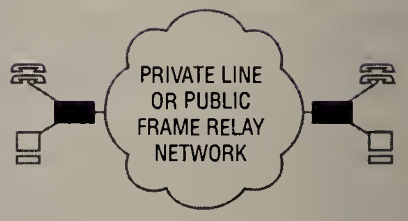


LAN-TO-LAN CONNECTIVITY



VOICE/DATA INTEGRATION

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EDITORIAL INSIGHTS

A challenge for the Big Four

If you're a little punchy after NetWorld+Interop, I'm not surprised. Boxing was the theme of the show — with Novell putting on the gloves in a mock directory services title fight vs. Microsoft, and a thick-necked young pugilist from the Cabletron corner beating up on paunchy old champ Cisco in one of the loudest booth displays in recent memory.

Novell's ring antics were aimed at breathing some vigor into the shambling body corporate, while Cabletron's fist-flexing was just the latest scrappy tactic from the combative company. Cabletron has also taken this no-holds-barred approach in ads aimed at blowing big holes in Cisco's switching strategy.

As a watcher from ringside, I love this stuff. In-your-face competition is healthy, and all the genteel posturing from vendors who claim to be "solutions-oriented" and "customer-focused" sure gets wearisome.

But when it comes to the Big Four networking vendors, this battle of the switching "marketectures" is generating more heat than light. It does little to help customers understand the very real differences in the switched networking strategies of 3Com, Bay, Cisco and Cabletron.

Theoretically, that's where the press and analysts come in. But we're not doing a good enough job exploring the strengths and weaknesses of each vendor's plan for moving your company from a shared-LAN environment to a switched future.

As one step toward rectifying that, I'm writing a letter to the CEOs of the Big Four, asking them to commit to sending a top technical representative to a presidential-style debate on network strategy at an upcoming trade show. I'll bring together customers and analysts who can grill these executives on their technologies and their ideas. Prior to the debate, I'll survey you to find out what you'd like to learn.

We'll report in print the highlights of the debate, and we'll run the full transcript of this face-off on Network World Fusion (www.nwfusion.com). We'll also follow up with coverage of the major issues that are raised during the debate.

So, John Chambers (Cisco), Andy Ludwick (Bay), Eric Benhamou (3Com) and Bob Levine (Cabletron): Will you commit to sending your best technologists to debate strategy? Readers: I'll keep you posted on their answers.

John Gallant, editor in chief jgallant@nww.com

Teletoons

By Phil Frank and Joe Troise
baba@sfgate.com

Okay, fine... I will not reveal to your friends in the Internet community that you are, in fact, a dog, if, in turn, you pay off this #782 bill for on-line charges!
GRRRR...
Phil Frank

NETWORK CONVERGENCE

Despite merger mania, new players will drive public net services

Mary Johnston Turner

When I ask public network service providers, their equipment and software suppliers, and their bankers how they see the industry evolving, I increasingly hear the drumbeat of consolidation, consolidation and more consolidation.

Many are betting that within the next three to five years, the sheer acquisition power of the regional Bell operating companies and top interexchange carriers (IXC) will overcome all the nimble, new communications service players funded by venture backers and initial public offerings. As evidence, they point to WorldCom, Inc.'s recent $14 billion takeover of MFS Communications Company, Inc. The fact that MFS itself had just acquired UUNET Technologies, Inc., a major Internet access provider, adds fuel to their argument, as does the pending Bell Atlantic Corp./NYNEX Corp. deal.

For an industry that has grown in large part due to the success of new entrants (who even heard of MCI Communications Corp. or Sprint Corp. 15 years ago?), it's ironic that we now appear ready to write off literally hundreds of dynamic, creative new companies in the belief that, after all this time, the traditional players are going to acquire their way to success. We are talking about the same RBOCs and IXCs that, according to most large users, cannot consistently support plain-vanilla frame relay networks at acceptable levels of reliability and performance.

> *Basically, the RBOCs and IXCs will remain focused on their core competency, running very large-scale network infrastructures.*

It is still the rare user who will trust an RBOC or IXC with turnkey end-to-end provisioning, operations and planning of a mission-critical data network. Even more rare is the user who expects that these traditional players will successfully host mission-critical servers and commercial online activities.

Obviously, the traditional players are pursuing many initiatives in areas such as data networks, electronic commerce and online services. Some of the most noteworthy have been spectacular failures, such as the implosion of AT&T's New Media Services group earlier this year. New Media Services was built on AT&T's acquisition of Ziff-Davis' online service and technology platform. But just because you have money doesn't mean you have an effective business model or know how to execute the vision.

Contrary to popular wisdom that favors RBOCs and IXCs, I believe the public service industry will follow a different model — one that gives more credit to the little guys and provides information technology (IT) managers with a shred of hope that they will actually be able to get what they want from third parties when they need it. According to this model, the traditional players will do what they do best — provision and support transmission facilities.

Basically, the RBOCs and IXCs will remain focused on their core competency, running very large-scale network infrastructures. What will change is who they sell to. Today, they sell to end users — both individuals and organizations. In the coming years, they will likely sell more to a plethora of focused, value-added service providers. Rather than running duplicate infrastructures, these providers buy transport and wrap it up with value-added services.

Essentially, I'm betting on stabilization and a bit of consolidation at the infrastructure level, but a continued dynamic market for providers of real business value-added services. Targeted electronic commerce offerings, such as IBM's recently introduced industry-specific commerce services AutoNet and PetroConnect, are where the action is going to be. Other value-added services such as managed E-mail or workgroup services (currently being offered by firms such as Infonet Services Corp.) will flesh out this new generation of public value-added network services.

For IT managers, this means you'll increasingly be dealing with a different set of suppliers to get your job done. The service-level agreements (SLA) you craft will be about business metrics, such as transaction processing time or message delivery reliability. You'll be less interested in raw network performance metrics.

The carriers will still worry about the network, but your interface will be with the value-added service provider. Your value-added SLAs will include assumptions about underlying network performance. And it will be the value-added service provider's job to ensure the network facilities do their job.

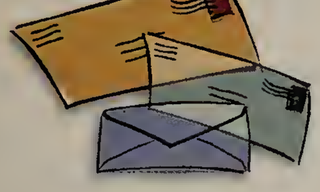
Can you buy this way today? Certainly not across the board, although over the next year you can expect more and more value-added services to come to market. Getting these new relationships right will take some effort on all sides. And changing the dynamic and the interface with your traditional facilities providers may be one of the more difficult and longer term transitions you'll face.

The key at this point is to be attuned to the shift. Consolidation at the infrastructure level (essentially, the wholesale part of the telecom market) no longer dictates consolidation at the value-added retail level. IT managers who can adapt their service provider partnerships and strategies to the evolving market structure will be much more likely to be able to launch new value-added initiatives for their organizations.

Betting on the old money to get the value-added portion of the world on track is a bad wager in fast-moving areas such as electronic commerce. Successful innovation is much more likely from newer players that know better how to marry advanced computing and software technology with commodity transmission service provided by the traditional players.

Turner is a vice president with Northeast Consulting Resources, Inc., a Boston-based consulting firm. She can be reached at (617) 654-0619 or via the Internet at turner@ncri.com.

MESSAGE



QUEUE

Don't discount ISDN

Kevin Tolly is correct in warning of the unexpected shock of excessive ISDN bills ("ISDN to the branch office: Theory meets reality," Aug. 19, page 41). However, his advice to "forget about using ISDN as a primary branch-office link" may be a bit drastic.

Tolly identifies the fragility of spoofing techniques as one of the two key reasons for high ISDN charges. While it is true that some ISDN routers are not up to the job of spoofing protocols commonly found in client/server environments, many companies are successfully using ISDN routers in their remote offices.

Where high ISDN bills do occur, we've found it is due to traffic that the network manager does not necessarily know about. A common culprit, for example, is a remote Windows 95 workstation periodically browsing a master Windows Internetworking Naming System server on the corporate network. The cure to problems such as these are becoming increasingly well known, and it is the vendors' duty to make sure users do not get stung.

The other deficiency Tolly identified, lack of usage monitoring tools to track and cap ISDN call costs, has been addressed. The emerging industry standard for controlling remote network access, Remote Authentication Dial-In User Service, provides a solid basis for dial-in authentication, authorization and accounting systems.

The bottom line is that with the right product, in the vast majority of cases, excessive ISDN usage charges are entirely avoidable.

Sally Bament
Vice president of product management
WAN/Universal Access
Enterprise Business Unit
Bay Networks, Inc.
Billerica, Mass.

Kevin Tolly's column on ISDN to the branch office provides an excellent example of what can happen when products are not properly matched to the intended application. However, the sweeping conclusion that ISDN and all products using ISDN are not suitable for branch office-to-headquarters communications, or other enterprisewide environments, is simply incorrect.

The fact is that companies already are using ISDN routers effectively to send data over leased lines in just the kind of network environment Tolly refers to, saving money in the process. The key to success is to choose routers designed from the ground up to support ISDN and use appropriate applications. This conclusion was, in fact, reached in *Network World's* own review of ISDN routers (Dec. 4, 1995, page 47).

George Brostoff
President
Symplex Communications Corp.
Ann Arbor, Mich.

In his column on ISDN to the branch office, Kevin Tolly made a major omission.

I provide technical services, including networking, for the Saginaw, Mich., School District. Our district has connected nearly 40 buildings using dual B-channel ISDN. Because we are a Centrex user and our ISDN was installed as a Centrex service, we pay no usage charges for in-district ISDN calls. Our lines are left up 24 hours a day, seven days a week and have operated flawlessly. We are receiving 128K bit/sec service to each building instead of the 56K bit/sec offered by leased-line or frame relay options, and we get it at less than half the cost of either of the slower options.

I agree totally with the concerns about spoofing and usage costs in a dial-on-demand mode, but don't discount all branch-office applications of ISDN.

Kyle Warner
Technical support specialist
School District of the City of Saginaw

Tolly responds: You are correct. I did not take into account those lucky users whose geography allows for zero connect charges. Here in New Jersey, Bell Atlantic charges us even when we dial out of and back into the same building!

Address correction

Overall, your article "Finding your way through TCP/IP" was quite good as a primer (Aug. 19, page 45). However, it contained a couple of errors that should be corrected.

The article states, "There are more than 65,000 Class B addresses, each of which support 65,534 unique 16-bit host addresses."

However, there are just over 16,000 Class B addresses, not more than 65,000. Class B uses the first two octets of the IP Version 4 (IPv4) address. The first two bits are always 10. The remaining 14 bits of the first two octets are used to assign network addresses for a total of 16,384 values. Since all ones and all zeros are reserved, that leaves 16,382 addresses. Each Class B address does support 65,534 unique 16-bit host addresses.

The article also states: "Three octets (24 bits) are used to specify network addresses in Class C, resulting in nearly 17 million network address combinations, each of which can support 254 IP addressable nodes."

This is also incorrect. There are just over two million Class C addresses, not nearly 17 million. Class C uses the first two octets of the IPv4 address. The first three bits are always 110.

The remaining 21 bits of the first three octets are used to assign network addresses for a total of 2,097,152 values. Since all ones and all zeros are reserved, that leaves 2,097,150 addresses. Each Class C address does support 254 unique 8-bit host addresses.

Buddy Shipley
President
Shipley Consulting International
Edwards, Colo.

In Figure 2 of "Finding your way through TCP/IP," the range of network addresses in Class A and Class C are incorrect. In Class A, the correct range is 1 to 126; the network address 127 is designated for loopback address, which should not be included as a network address. In Class C, the correct range is 192 to 223; the network addresses after 223 are assigned to Classes D and E.

Wen-Haw Ting
Flushing, N.Y.

Editor's response: Your points are well taken. Thanks for setting us straight.

Restrictions remain

Regarding your article "Key-escrow firewall ready to leave the country" (Aug. 26, page 1): It's important to note that the Clinton administration has not vowed to totally end export restrictions on key-escrowed products. The administration has agreed to let out relatively weak 64-bit products, if they are escrowed.

This is far below the minimum key length of 80 bits recommended by key-escrow experts.

U.S. software companies will continue to suffer until such time as the administration realizes that strong cryptography not only will continue to exist, but will flourish as it enables online commerce.

Adam Shostack
Independent consultant
Boston

Clinging to VINES

Your article "NT Server 4.0 still lacks that enterprise punch" was accurate and addressed the biggest problem with NT in general (Sept. 2, page 1). However, it glaringly omitted the one network operating system (NOS) that is truly global and scalable as no other one is — Banyan Systems, Inc.'s VINES.

Why is it that technical journals universally ignore Banyan's existence in the NOS arena? VINES does not use domains and is easy to administer. Sprint Corp., Nike, Inc., the U.S. Marine Corps and Compaq Computer Corp. are just a few of the organizations that have embraced VINES and have no intention of migrating to NT.

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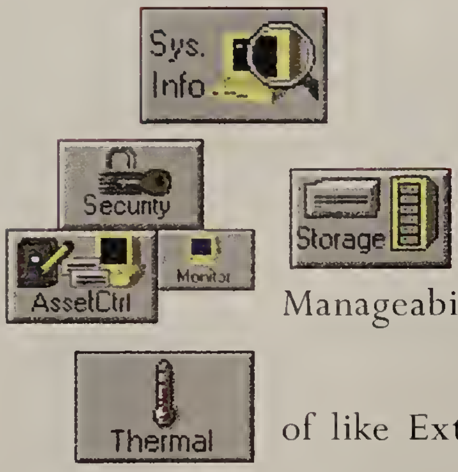

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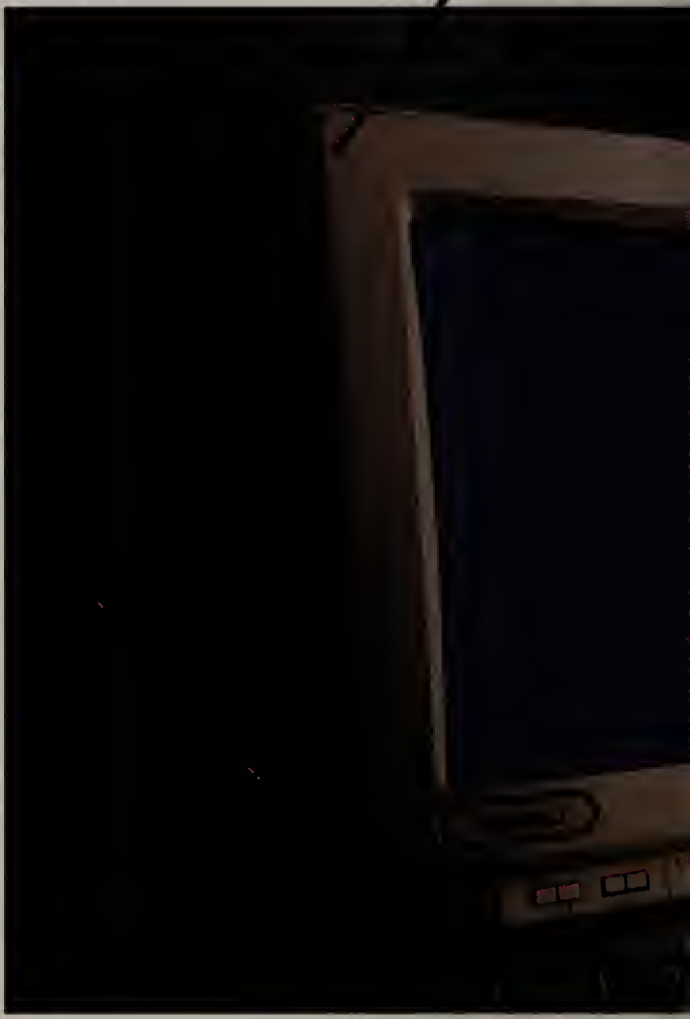

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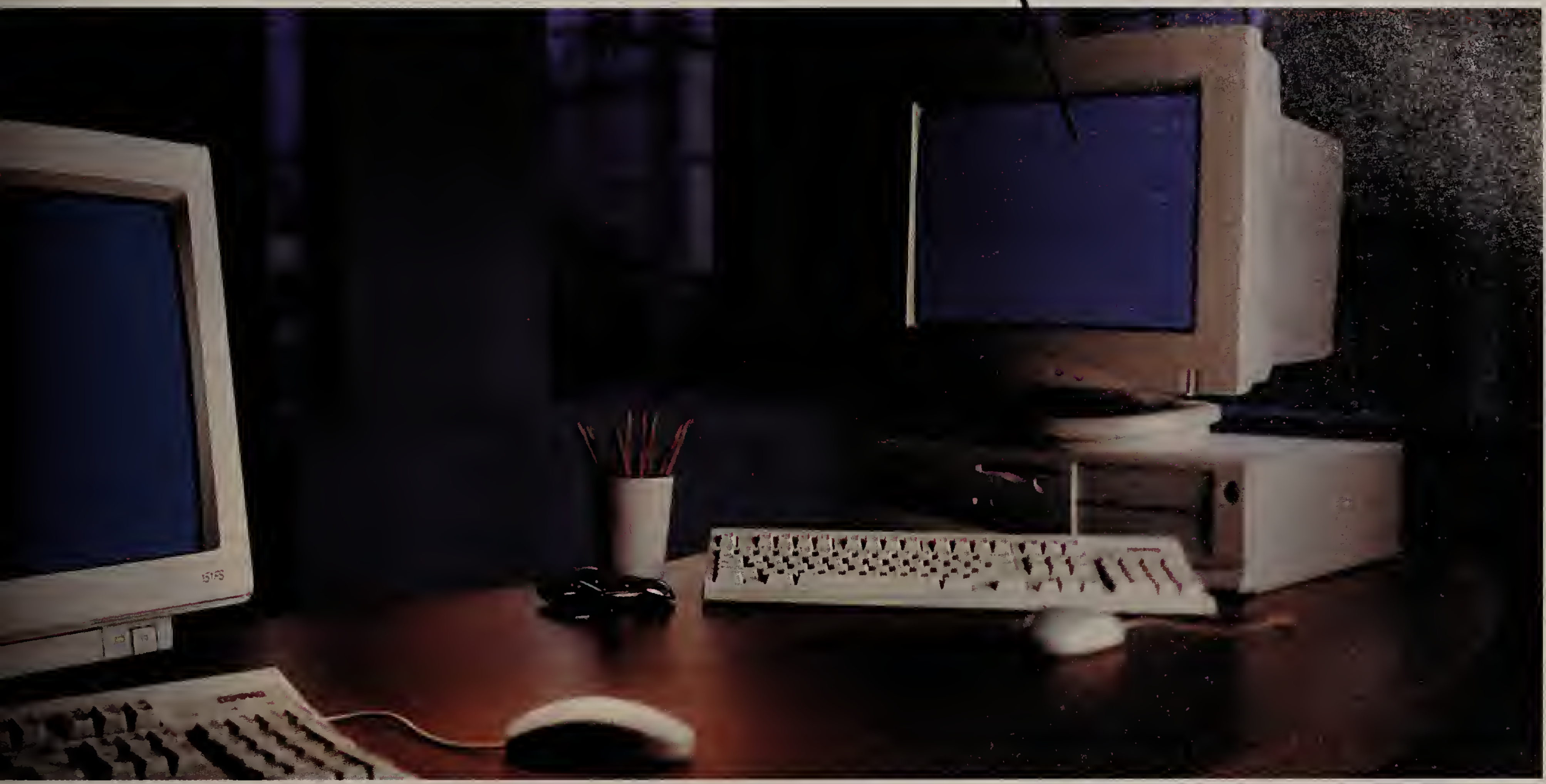

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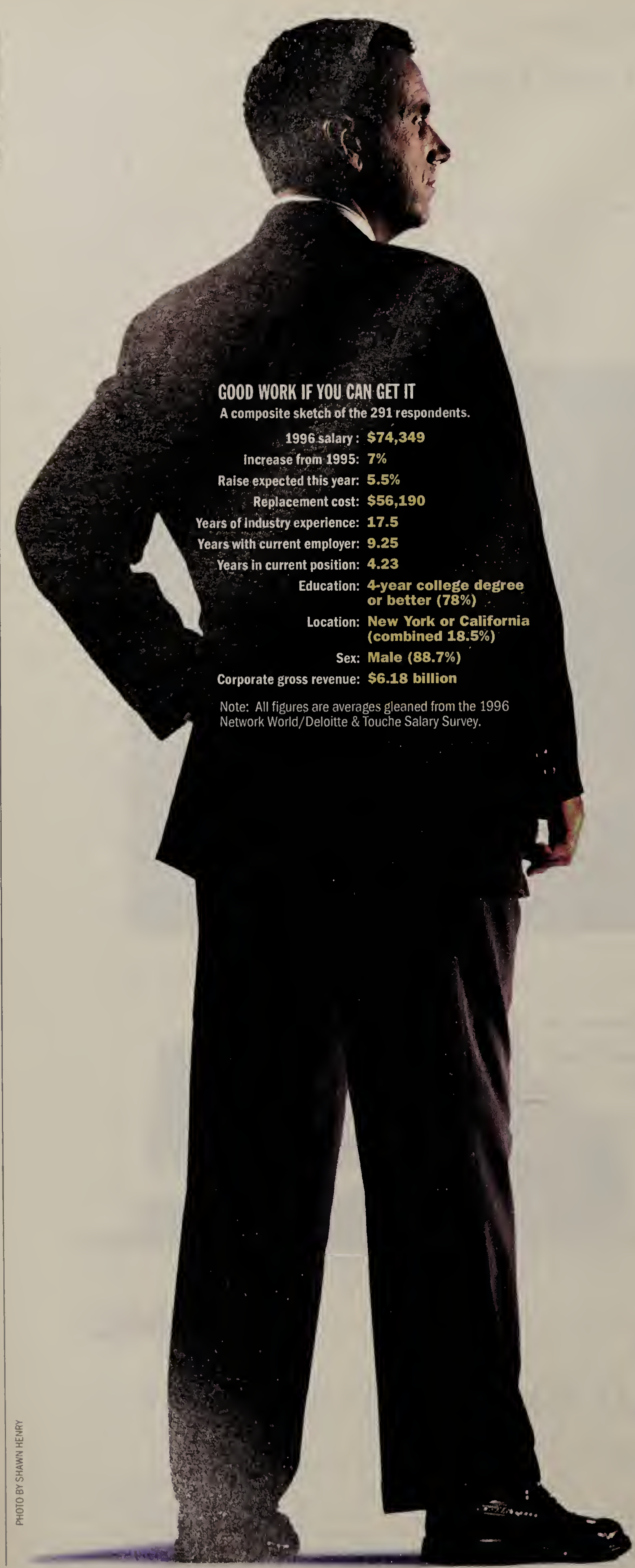
Salaries are on



GOOD WORK IF YOU CAN GET IT

A composite sketch of the 291 respondents.

1996 salary:	$74,349
Increase from 1995:	7%
Raise expected this year:	5.5%
Replacement cost:	$56,190
Years of industry experience:	17.5
Years with current employer:	9.25
Years in current position:	4.23
Education:	4-year college degree or better (78%)
Location:	New York or California (combined 18.5%)
Sex:	Male (88.7%)
Corporate gross revenue:	$6.18 billion

Note: All figures are averages gleaned from the 1996 Network World/Deloitte & Touche Salary Survey.

PHOTO BY SHAWN HENRY

Continued from page 1

Would you be able to convince Cummings to stay in the face of an offer like that? Not likely, experts say, unless you've laid some significant groundwork beforehand. That entails paying heed to the things that motivate people beyond salary, things such as having a challenging work environment and the opportunity to grow professionally.

Well, now's the time to lay that groundwork because, as the 1996 Network World/Deloitte & Touche Salary Survey clearly indicates, salaries are on the rise for most network-related postions, meaning more of your staffers may be fielding offers similar to, if not quite as generous as, the one Cummings got.

At the same time, you should see significant growth in your own salary, especially if you have the proven project management skills that end-user, outsourcing and consulting companies all covet.

That is the salary picture painted by the 291 respondents to this year's salary survey, our first done in conjunction with Deloitte & Touche Consulting Group, the telecommunications consulting arm of Deloitte & Touche LLP. For this year's survey, we went after high-end readers, those at companies with $1 billion or more in annual gross revenue and more than $10 million a year in network equipment and services purchases. We also surveyed Deloitte & Touche's client base, which is made up of managers at similar-sized companies. Why the high target? Because no matter what size your company is, these are the folks you're competing with for the best talent.

On average, respondents received a 7% salary increase this year from last and expect another 5.5% hike in '97. That far outstrips total compensation increases for civilian job sectors, which experienced an overall hike of just 2.9% for the 12 months ended in June, according to the U.S. Bureau of Labor Statistics.

"It's gotten pretty brutal, from the standpoint of what kind of increases you've got to give people," says Michael Prince, chief information officer at Burlington Coat Factory Warehouse in Burlington, N.J.

One CIO, who said he'd recently turned the corner on getting salaries in line with market reality, declined to be named for this article, saying, "I really don't want to send an invitation to all the headhunters of the world to start calling my people."

NetworkWorld
Deloitte & Touche Consulting
Salary
Survey

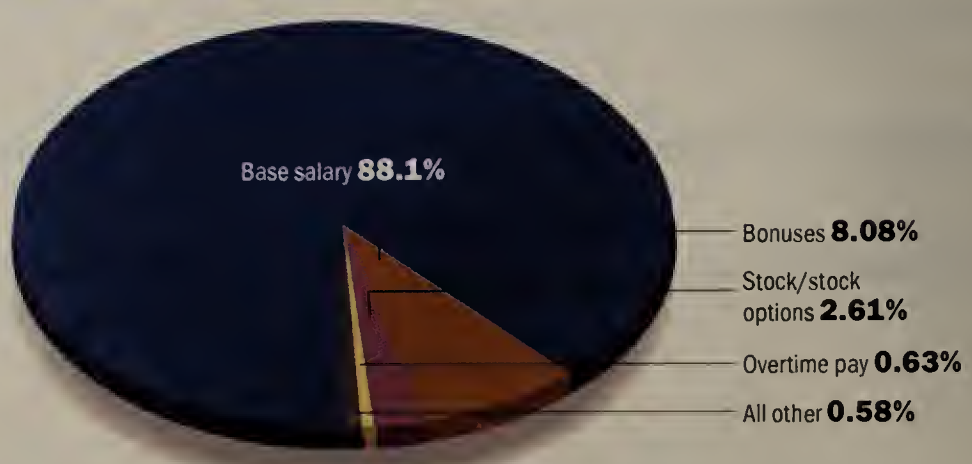
The chart on page 53 shows the salary breakdown by position. As you would expect, those with strategic planning and project management skills generally come out on top of the pack, whereas those with operations and liaison skills are lowest on the scale.

What gets interesting is the compensation breakdown, or how much of the total package is straight salary vs. bonuses, stock options and other incentives. More than a third of respondents (36%) say at least 11% of their pay comes in some form other than base salary.

Jill Herrin, president of the recruitment firm J&D Resources, Inc. in Memphis, Tenn., thinks even more networking types are cashing in on bonuses. "Probably 50% to 60% of networking people are now on bonus plans, which were not commonplace even three years ago," Herrin says. "People like to think that if they do a good job, they're going to reap some rewards from the profits of the company. It's a very effective way to keep some loyalty."

At The Prudential Insurance Co. in Roseland, N.J, all technical employees participate in an incentive-based compensation plan, according to Bill Rush Jr., vice president of information systems for the firm. There are three types of bonuses: one based on the employee's

THE AVERAGE SALARY PACKAGE



the rise

performance combined with the overall company performance; a bonus for extraordinary work; and a special compensation bonus delivered twice a year that goes to people with certain skills.

"Everybody knows what those skill sets are and if those people are performing at a high level, that bonus becomes available to them," Rush explains.

"Five years ago, it was very difficult to get anything significant in the way of bonuses. Hot technology skills were not recognized," he says. Upper management changed its tune when "we started losing some very good people and said, enough's enough."

The idea of a signing bonus also appears to be catching on. "It's always been a practice, but we're seeing greater instance of it," says Frank Schoff, president of Management Recruiters, a Cedar Mountain, N.C., firm that specializes in the placement of network professionals. "In many cases, it's used as a way to maintain the existing salary structure, but offer an initial, onetime incentive."

John Wallin, chief executive officer of the recruitment firm TechKnowledgE in Irvine, Calif., says such bonuses aren't outrageous sums of money and typically come in at less than 10% of the base salary. "But it's cash now; $5,000 now sure beats the same amount spread out over a few months."

The trend upward in compensation isn't showing any signs of abating, according to Rick Roscitt, managing partner of the worldwide outsourcing practice of AT&T Solutions in Florham Park, N.J. "Salaries always tend to lag a bit with market reality. I think they're catching up to the reality that it's a network-centric world," he says. "I don't think we've seen a full correction yet. You can't grow talent fast enough to see a correction over the next three to five years."

Schoff speculates that outsourcing firms such as AT&T Solutions and contract companies such as 3D Solutions that essentially resell a person's time are helping drive salaries up. "If they can sell something at $200 per hour, they're not at all reluctant to pay $100," he says.

Toughest to find

That also means such firms are scooping up a fair number of candidates with the most desirable skills. According to the survey, the top four such areas are client/server development and deployment, Internet/intranet skills, network management and Windows NT. At least 40% of respondents cited those four areas when asked which skill sets were most in demand, forcing them to pay a premium to employees who had them.

"The internetworking slice of client/server is especially difficult — the whole router, hub architecting as well as the high-level problem resolution in diverse environments," Rush says.

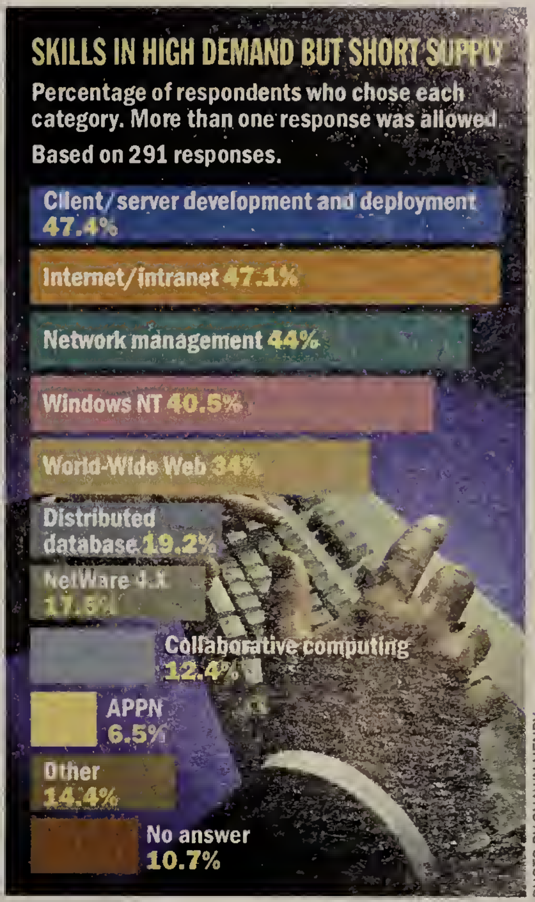
Headhunters confirm such skills are in demand and say anyone with experience in multiple protocols can expect to fare well. And nearly everyone interviewed for this article agreed the toughest people to find are those with strong project management skills, who can plan and implement end-to-end networks without getting bogged down in day-to-day firefighting.

"It's the strategic planning of the network and the approach to proactively managing it that I think is in short supply, not just putting out [requests for proposal] for cheap switches — anybody can do that," says Ward Keever, senior vice president of information services for Medical Center of Delaware in Wilmington.

"Rangers" not wanted

How do you find such people? "I tried giving away my first born. It didn't work," Rush says. "What it really is, is being out and about consistently. You can't wait till you've got the slot open."

Educating existing staffers in the technical areas most in demand is also an option, and one that can help you hold onto your best people. That's fundamental to Prudential's incentive-based compensation plan. Being clear with employees about which skills the company deems most valuable encourages education in those skills. "We help them get the skills they need," Rush says, even going so far as to put some employees through consultant training, which teaches them what a professional consultant does and how they think.


SKILLS IN HIGH DEMAND BUT SHORT SUPPLY

Percentage of respondents who chose each category. More than one response was allowed.

Based on 291 responses.

PHOTO BY SHAWN HENRY

Obviously, you can't afford to give everyone that kind of training, so how do you know which employees are worth the expense? "Experience, judgment and gut-level intuition," says one vice president at a major bank. "You've got to know your person and what turns them on, which means taking the time to sit down and talk with them about employment goals.

Keever looks for four things as signs that an employee is worth that kind of investment: drive or initiative; demon-

BASE COMPENSATION FOR 1995-1997 BY JOB FUNCTION CATEGORY

Numbers indicate percent of respondents that fall within the various salary ranges.

Job function	$1 - $39,999	$40,000 - $49,999	$50,000 - $59,999	$60,000 - $69,999	$70,000 - $79,999	$80,000 - $99,999	$100,000+	No answer	Average salary
Management/ strategic planning									
1995	7.3	5.3	9.3	16	18	19.3	20.7	4.1	**$78,447**
1996	4.7	5.3	8.7	14	15.3	24.7	24	3.3	**$83,937**
1997	2.7	6	7.3	11.3	14	25.3	28	5.4	**$88,391**
Project management									
1995	4.1	12.2	20.4	26.5	16.3	10.2	8.2	2.1	**$65,908**
1996	0	12.2	14.3	28.6	20.4	14.3	8.2	2	**$71,351**
1997	0	6.1	12.2	22.4	16.3	24.5	8.2	10.3	**$76,640**
Engineering									
1995	13.3	24.4	20	17.8	13.3	4.4	6.7	.1	**$57,967**
1996	6.7	15.6	26.7	20	13.3	6.7	4.4	6.6	**$61,283**
1997	4.4	11.1	26.7	22.2	15.6	13.3	4.4	2.3	**$64,632**
Operations/ provisioning									
1995	18.2	22.7	18.2	13.6	9.1	13.6	0	4.6	**$55,281**
1996	13.6	18.2	27.3	9.1	13.6	13.6	0	4.6	**$57,200**
1997	13.6	13.6	18.2	22.7	9.1	18.2	0	4.6	**$59,024**
Other									
1995	18.2	27.3	9.1	13.6	13.6	0	13.6	4.6	**$57,673**
1996	13.6	27.3	13.6	13.6	9.1	9.1	13.6	.1	**$61,336**
1997	13.6	18.2	18.2	13.6	13.6	9.1	13.6	.1	**$66,630**

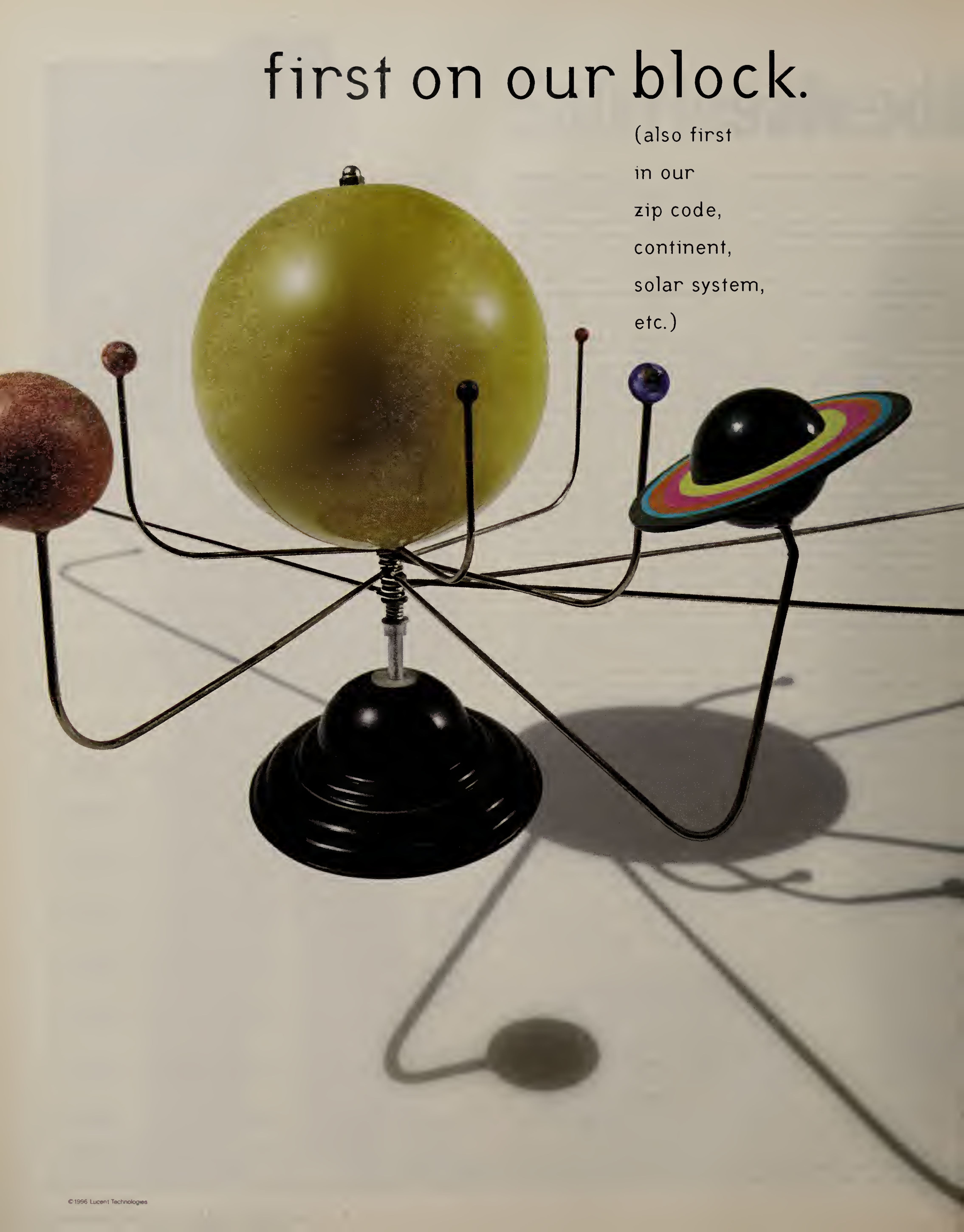
Management/strategic planning is the job function to shoot for if you're looking for the big bucks. Next year, it's expected that more than three-quarters of professionals in these positions will be making $60,000 or more in base salary alone.

THE COMPLETE SALARY STORY

Position	1996 avg. salary	% increase between 1996 and 1997	New-hire replacement cost
Management/strategic planning			
Senior level	$96,607	5.7	$92,659
Entry level	$63,685	5.7	$63,432
Communications finance			
Senior level	$76,374	5.6	$68,445
Entry level	$43,915	4.7	$43,985
Project management			
Senior level	$74,943	5.7	$70,321
Entry level	$50,254	5.3	$50,208
Engineering			
Senior level	$69,875	5.4	$66,131
Entry level	$45,674	5.4	$45,435
Application development			
Senior level	$67,280	5.3	$65,208
Entry level	$41,862	5.6	$41,860
Operations/provisioning			
Senior level	$61,357	4.7	$55,155
Entry level	$37,319	4.8	$36,588
Vendor or user liaison			
Senior level	$58,705	4.7	$51,357
Entry level	$35,935	4.4	$35,871

Experts caution against lowballing new hire replacement costs, as many respondents seemed to do, because demand is continually driving up costs.

Based on 291 responses.



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1. first software that creates "universal mailbox" using customers' existing servers. Makes e-mail, voice mail, faxes available from any phone or desktop pc. (Letters from Mom still come old-fashioned way.) Ask for INTUITY™ AUDIX Integrated Messaging.

1. first videoconferencing system with continuous presence, switching among up to 24 sites. (Nearly five times more than other guys' system.) Four sites on screen simultaneously. Named Multipoint Conferencing Unit.

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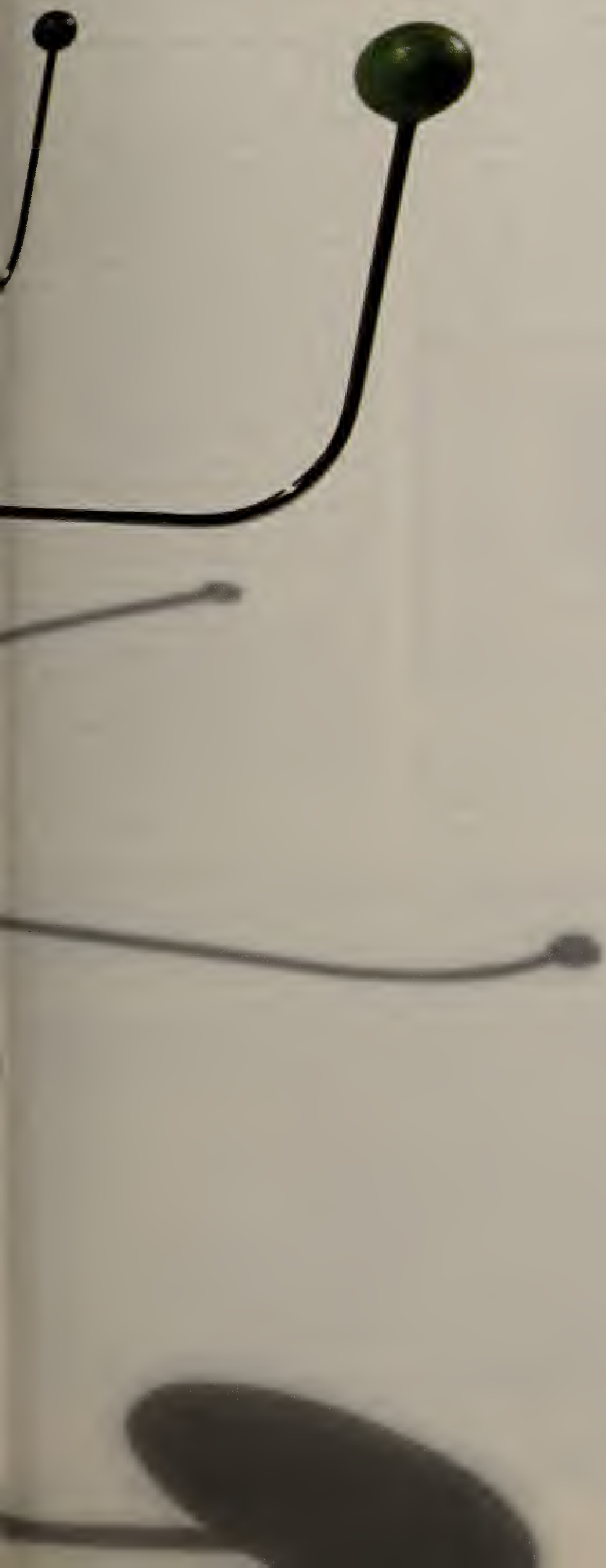


strated project management skills; technical skill set; and application knowledge. "First and foremost, we always look for the right person. You've got to be an optimistic team player. I don't need rangers; I don't need heroes. I want team players."

Asked how AT&T Solutions attracts talented people, Roscitt says: "Part of it is we grow it. We have AT&T Labs. We have a very aggressive education program inside AT&T." But make no mistake, AT&T also goes after people from end-user organizations. "What we tell them is the work they do can lead to significant career advancement and rotational assignments. We're not the telecom department of a bank or a finance company; we are a telecommunications company, top to bottom."

That brings up the question of how you keep your best people when another company is trying to steal them away.

"People will come and say, so and so has offered me a couple thousand dollars more," recounts one IS manager, who asked not to be identified. "In most instances, I say, 'When do you want to have your going away party?' In two or three cases, I've said I'd match the offer, but I'd only do it once — don't ask again. So far, with one exception, those people have stayed."

Prudential takes a different tack, Rush says. Staffers are encouraged to talk to their managers before accepting any job offer. Managers try to stay neutral, to consider the offer tendered, look at the opportunity offered and steer the employee in the right direction. "None of us take it as a negative" when an employee gets another offer. "These things happen."

In some cases, a counteroffer is your only choice if you want to keep a key employee. As Schoff points out, that's generally not a good practice, but may be necessary for damage control. "If you're about to lose your No. 1 engineer over $15,000 a year, and you'd have to pay that anyway in the market," then you make the counteroffer. "But some of the damage has already been done. They'll say 'Why wasn't I worth $15K more last week?' It's a catch-22."

It's more than money

But as the survey shows, salary is only part of the reason employees change jobs. Of respondents who changed companies in the past year, 34.7% said they did so for increased compensation. Another 23.6% said it was for additional responsibility, and 22.2% said the opportunity to learn new skills was the primary driver.

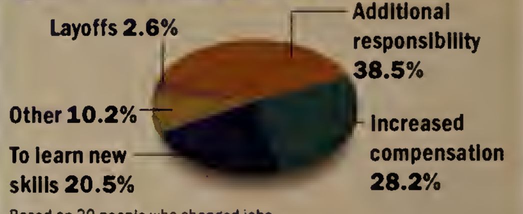
Companies that pay attention to those latter two areas stand a good chance of holding onto their best talent and withstanding a CJ Cummings-type offer.

Technology is moving so rapidly, people want to get on to the latest and greatest," Herrin says. "The more state-of-the art your environment is, the less likely you're going to have turnover. People who are at beta test sites are hard to recruit away."

Juli Ann Reynolds, vice president of the advanced technology practice at recruitment firm Korn/Ferry International in Boston, offers another key to keeping your best people. "Offer mentorship and succession planning. There should be someone in the organization who's looking out for that star, making sure they're getting what they need, that

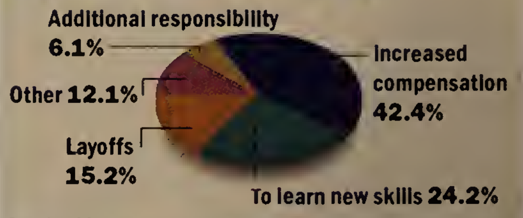
See Salaries, *page 59*

REASON FOR CHANGING JOBS



Based on 39 people who changed jobs.

REASON FOR CHANGING COMPANIES



Based on 33 people who changed companies.

BREAKDOWN BY SALARY CATEGORY

Management/strategic planning	CIO, VP, director, network manager, data communications manager, telecommunications manager, technical support manager
Communications finance	CFO, communications finance officer, financial analyst
Project management	Consultant, VP, director, network manager
Engineering	Network architect, engineering manager, consultant, designer, analyst, engineer
Application development	Client/server programmer, development manager, programming manager, programmer, systems analyst, database administrator
Operations/provisioning	Data center manager, training manager, technical support manager, network management or technical support specialist, network operator, help desk operator
Vendor or user liaison	Contract manager, client support manager, user support manager, client liaison

Sage advice from those in the know

Frank Schoff, president of Management Recruiters, Cedar Mountain, N.C.

How to convince upper management to spend more on IS salaries: "A local market salary survey, even if it's self-initiated, is one of the best tools you can use." Using a local professional association, or even your own human resources department, you should poll at least 20 area companies to get a fix on the salaries they're paying. Offer to share the results with those who help. "That's probably the best indication of what the market demands."

How to know whether to retrain or recruit: "First, determine if the person has a desire to be retrained. Simply having a training program and trying to turn an apple into an orange may not work. And remember if you invest money in retraining, you're also likely to have to increase that person's salary to market rate, or you'll eventually lose that person.... I don't think in today's corporate world people will be eternally grateful to the point that they continue to work for less money."

John Wallin, CEO, TechKnowledgE, Irvine, Calif.

How to keep staff happy: "Take care of them. Cash will help keep people around, but they've got to have interesting work, too. It's a combination of keeping the work interesting, having current tools around and paying people above average."

Why people change jobs: "It's usually a couple of things. In our business, the work ends – a project is completed and there isn't another challenge worthy of whoever is involved. There's also personality conflicts, or chemistry – somebody just doesn't like who they work with. Sometimes there's not much you can do about it, but good communication can help clear up problems."

Gerard Cunningham, partner, Deloitte & Touche Consulting Group, New York

On managers who expect they can replace a given staffer with another at less cost: "What they're saying is they're replacing mid-level people with lower level people and paying them less. That's going to get harder to do. In highly targeted areas, the demand curve will force up the base pay and the replacement cost will be equal to or higher than the averages people have seen in the past."

On the number of network IS staffers with four-year college degrees: "That is increasing because of the visibility communications is getting now. A few years ago, you didn't see user-oriented communications stories on the front page of the business section of the *Journal*. Now you're seeing that because there is more recognition of the dependence we have on communications and the importance of managing communications costs."

Julie Ann Reynolds, vice president, advanced technology practice, Korn/Ferry International, Boston

Signs that an employee will grow quickly: "We watch how they manage their career path, and we then do a lot of referencing to check what others perceive them to be. There are a lot of self-starters out there who just love the technology. They sleep five hours and they're on the 'Net the other 19. They develop skills on their own as well as on the job."

Why people change jobs: "Opportunity. Opportunity for financial advancement, an opportunity to build equity in their career by broadening their skills – in this case, mostly technical skills. And then an opportunity to move into management."

Paul Desmond

PHOTO BY SHAWN HENRY

CAUTION
INTERNET
HAZARDS
AHEAD

Fixing the 'Net

ISP efforts won't pay off soon enough.

. . . but Merit's Bill Norton says, "It's clear the public Internet cannot handle real-time audio and video in its current form."

By Charles Bruno

Internet service providers are fighting a number of network wildfires and doing their best to snuff out hot spots as they flare up. While many are becoming adept at stamping out localized fires, their efforts fall short of addressing the larger Internet reliability problems that cross ISP boundaries.

Last week, we pointed out a number of concerns — World-Wide Web congestion and backbone packet loss due to router instability, to name just two — that are making the Internet unfit for strategic business applications. This week, we're assessing the steps ISPs and others are taking to improve Internet use for critical corporate applications.

The conclusion is that the Internet's underlying infrastructure issues are going to be with us for at least the next two to three years. Sure, there may be some short-term fixes to fine-tune routing flows, but congestion is here for the long haul. Even if you double the capacity of the Internet overnight, applications and usage will rise to meet the new levels.

ISPs are banking on new bandwidth reservation and quality of service (QoS) features to guarantee availability of bandwidth for strategic applications. But you'd better not count on those offerings anytime soon.

Even though Cisco Systems, Inc. is making hay over some new strides in this area, it will be at least a year before ISPs offer the first of these services, and even then, probably only over their own nets. Inter-ISP bandwidth reservation will likely take longer, as a number of kinks need to be ironed out.

Don't get burned

If you've already committed strategic applications to the Internet, you need to make sure you don't get burned. There are any number of steps you can take, from reevaluating your service provider, to using several access points to the 'Net, or even rethinking the design of your Web applications.

Jordan Becker of ANS says voice and video are "poised to be the next killer applications that could drive Internet growth..."

"The Internet is perfectly reliable for some applications and yet not for others," says Mark Luker, program director for the National Science Foundation Network (NSFNet). "Although the 'Net is not solidly reliable, it is under fairly rapid development to reach that status."

ISPs are busy nailing up circuit after circuit to keep ahead of bandwidth demands, tweaking routers to help them cope with enormous changes to routing tables, and they are serving up alternative services that let you use 'Net applications in a privatized intranet environment.

Will these steps help improve conditions on the Internet? Probably. But they fall well short of providing the kind of reliability and continuous availability needed for strategic business applications.

To some, that's no surprise. "The Internet is a connectionless network, which means it cannot do QoS or guarantee bandwidth," says Thomas Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy. "To expect the Internet to deliver predictable response times, then you're expecting it to do something it wasn't designed to do."

Yet that's exactly the direction in which ISPs are headed. The idea is to layer QoS and bandwidth reservation facilities on top of existing IP services — or along with ATM switching cores — so carriers can handle bandwidth-intensive applications, such as voice and video, and ultimately make users pay for bandwidth they use.

"The potential of a multimedia explosion — such as IP phone, IP fax, videoconferencing and even radio programs — means the Internet will have to scale to accommodate this type of growth," says Brent Bilger, director of product marketing for Cisco's Service Provider Market unit.

Cisco took the first steps in that direction last week when it announced a Tag Switching protocol for use on its routers and switches. In effect, Tag Switching will enable routers to mark packets on a prioritized basis for transport across the Internet. Other vendors are expected to follow suit with similar bandwidth reservation and traffic prioritization facilities.

"It's the voice stuff that is really frightening," says Ed Kern, vice president of systems with DIGEX, Inc., an ISP backbone provider. "The amount of traffic expected is really substantial. And most users think it's going to ride for free, but nothing will be free."

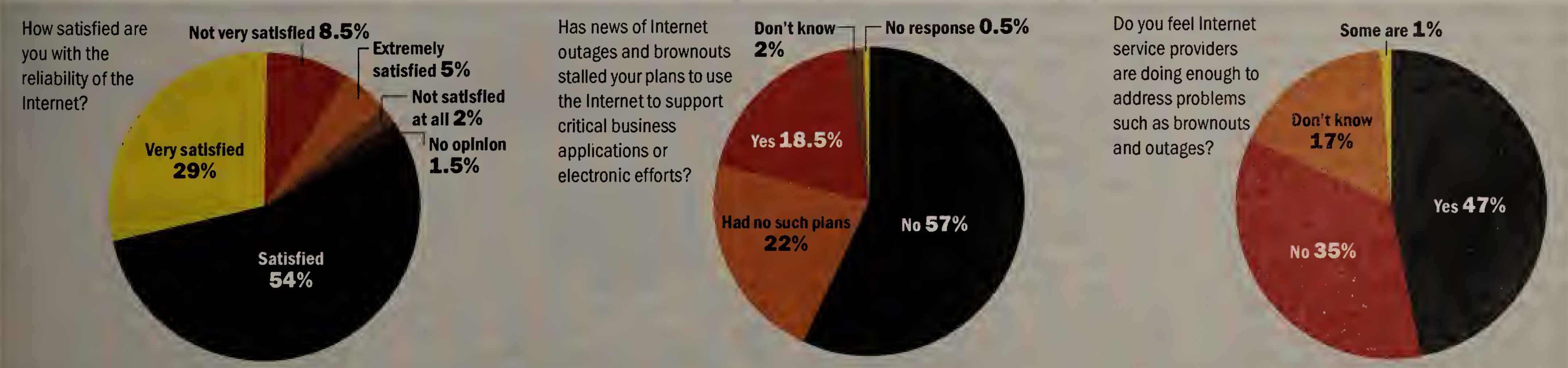
Even ISPs such as DIGEX that will offer transmission facilities for voice and video admit they likely will have a crippling effect on the 'Net's performance unless changes are made soon.

Guy Cook, president of regional ISP Colorado Supernet, says, "If 5% of Americans decide they want to pay an order of magnitude less for long-distance telephony over the 'Net, that traffic alone could cause some significant slowdowns and alter the Internet topology."

Jordan Becker, vice president of network services at Advanced Network Services, Inc. (ANS), another backbone ISP, agrees that voice and video are "poised to be the next killer applications that could drive Internet growth in the 1997-'98 time frame."

ISPs, Becker says, must build the capacity to support such growth, with the goal of "giving priority to real-time traffic."

Bill Norton, chairman of the North American Network Operators Group (NANOG), which coordinates activity among ISPs, says there's a need for infra-



SOURCE: SURVEY OF 200 *NETWORK WORLD* READERS WITH RESPONSIBILITY FOR PURCHASING INTERNET SERVICES structure overhaul.

"It's clear the public Internet cannot handle real-time audio and video in its current form," says Norton, who is also a senior engineer with Merit Systems, Inc. in Ann Arbor, Mich. He points to growing pockets of packet loss across the Internet that he says "affect interactive communications."

Brian Brown, director of new business development for the Commercial Internet Exchange (CIX), the first commercial traffic exchange for ISPs, says the advent of voice over the Internet will "place a larger strain on the 'Net."

Today, Brown says, a number of ISPs are experimenting with IP voice over the Internet, but within the next 18 months demand for voice will force them to offer "QoS guarantees and make them commit to oversell ratios to ensure they deliver the performance required by the customer."

The benefit of outsourcing Web server operations, according to IBM's John Patrick, "is you can have at your disposal virtual Web space that you expand and contract as needs dictate."

Susan Fitzgerald, executive director of CIX, says that as QoS and bandwidth reservation facilities sprout up, "the underlying infrastructure of the Internet will change, too. You'll see a lot of ISPs migrating to ATM in the backbone because it is designed to merge voice, video and data," Fitzgerald says.

ANS' Becker, however, doesn't believe ATM is the answer. ATM chops data into 53-byte packets, which, Becker says, is "horribly inefficient" in the event of packet loss. The resulting retransmission will cause scores of ATM cells to be rebroadcast for every packet lost.

Becker points instead to the development of the Resource Reservation Protocol (RSVP), which will enable IP routers to implement classes of service — somewhat analogous to ATM's available bit rate, constant bit rate and variable bit rate offerings. The upshot is RSVP allows applications to reserve bandwidth based on varying levels of priority.

RSVP is now nearing completion by the Internet Engineering Task Force and some vendors, such as Cisco and MCI Communications Corp., have disclosed plans to use it along with the Weighted Fair Queuing algorithm. Together, the two will guarantee bandwidth allocations and delay characteristics for different data types. This would enable videostreams or audiostreams, for instance, to secure a higher priority than less time-critical E-mail data.

Some, such as Scott Bradner, a consultant in Harvard University's Office of Information Technology, believe RSVP may have limited success in the business world. The technology, he says, will empower many individuals within a company to submit requests for bandwidth to generate videoconferences and the like. "What the organization doesn't know yet is that you're binding it to a resource allocation," a practice Bradner says companies may not enjoy once they get the bill.

The success of RSVP also hinges to a large extent on how well ISPs can work with one another to implement the protocol in a common fashion. That's critical for users needing to place a resource reservation between multiple ISP backbones.

"The handoff [between ISPs] will be messy until [financial] settlements fall into place," Bradner says.

Upgrade time

Of course, carriers aren't putting all their eggs in the RSVP basket. Other upgrades are in the works that may result in more timely peformance enhancements. Already, five months after it brought up a series of OC-3 trunks, MCI is looking at another major upgrade, this time to OC-12. Until recently, MCI's core consisted of 16 OC-3 links, most of which were supposed to be converted to OC-12 by the end of August, according to Robert Hagens, MCI's director of Internet engineering. More disturbing for MCI, though, is that Vinton Cerf, an MCI senior vice president and resident Internet pioneer, has predicted the need for still more bandwidth by next spring.

According to Hagens, the next step is to add more OC-12 rings to MCI's Synchronous Optical Network (SONET) as a stopgap until the carrier eventually moves to OC-48. "We believe we still can get a lot of mileage out of multiple OC-12 trunks," he says. MCI operates the highest speed Internet backbone and says it carries 40% of the Internet's traffic.

Sprint Corp. currently operates an IP-based router network layered on top of DS-3 circuits, according to Sprint's Pat Craig, group manager of IP Services. The next step, he says, will be to migrate the IP infrastructure to an OC-3 SONET net, which should happen by year-end. Craig adds that Sprint currently operates well below capacity, but acknowledges some traffic hot spots.

Most other network service providers also operate DS-3 backbones. Some, such as Apex Global Information Services, Inc., rely heavily on ATM, which will enable it to scale bandwidth as needs dictate. Others with dedicated circuits are content to nail up additional lines to keep pace with demand. Ultimately, those networks may require a more costly overhaul to move to the next level of bandwidth. But players such as Sprint and PSINet are hesitant to move to an ATM infrastructure for fear of managing a hybrid IP and ATM environment.

World-Wide Wait?

Clearly, a key driver forcing carrier upgrades has been the World-Wide Web.

Dubbed by some as the World-Wide Wait, anyone who uses the service knows all too well the experience of gaping at the screen waiting for data, or reaching a dead end due to a network error.

One reason for that Web crawl may be due to increases in backbone packet loss and latency, says NANOG's Norton. If packets get dropped as you're trying to access a Web site, it naturally takes longer for the connection to go through, and longer for the data to come across the connection. If you lose one out of every 10 packets, according to Norton, you may wind up waiting for retransmissions. "So you may spend 10% more time waiting for that Web page to show up," he says.

But the problems on the Web aren't necessarily driven by the Internet's infrastructure. In fact, more often than not, experts say the delays are created by the way Web page developers design their pages and store data.

There's more on Fusion:

- **The Routing Arbiter site maintained by Merit Systems is expected this month to launch NetNow, a prototype tool that provides real-time NAP and ISP backbone delay and packet loss performance statistics.**
- **Check out what ISPs, NAP operators and others had to say about the state of the Internet at the May 1996 North American Network Operators Group meetings.**
- **A visual map of the network service provider interconnections and traffic exchange points. Includes hotlinks to NAP traffic statistics.**
- **The Internet Weather Report, a daily MPEG map that displays congestion hot spots and other conditions on the network.**

FIND IT ON FUSION 9603

Network World Fusion
http://www.nwfusion.com

"The single greatest cause of Web delay is at the far end," says Michael O'Dell, chief technology officer for UUNET Technologies, Inc. "Either the Web server doesn't have enough horsepower or the connection to it is not fast enough to handle the load coming at it."

"The potential of a multimedia explosion — such as IP phone, IP fax, videoconferencing and even radio programs — means the Internet will have to scale to accommodate this type of growth," says Cisco's Brent Bilger.

According to O'Dell, "All it takes is one of these sites to be listed as Cool Site of the Day, and it is toast."

Mark Kosters, principal investigator for the Internet Network Information Center (InterNIC), says the Web is being stretched to the breaking point. "The model has changed from fairly sizable packets the Internet can handle to smaller packets with short sessions," he says. "It's a lot of set up and tear down of TCP connections that the Web faces. Obviously, some changes are needed."

The InterNIC runs the root name server that is central to the Internet's Domain Name Service tree. That server is now handling 1,000 query/sec — a dramatic rise, Kosters says. He says the InterNIC handled 31 million WHOIS queries two months ago, each of which can bring back as many as 2,000 results.

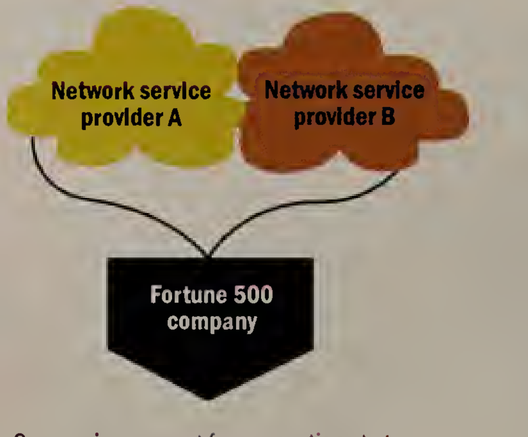
Dan Benjamin, an Orlando, Fla., consultant, says there's a need to distribute Web page data geographically. "The main Web server for a company should receive requests and decide which downstream server with the lowest load should handle the call," Benjamin says. "There needs to be more intelligence in the network to decide on load balancing and make routing decisions based on server loads and traffic flows on various lines."

Enter WOMplex

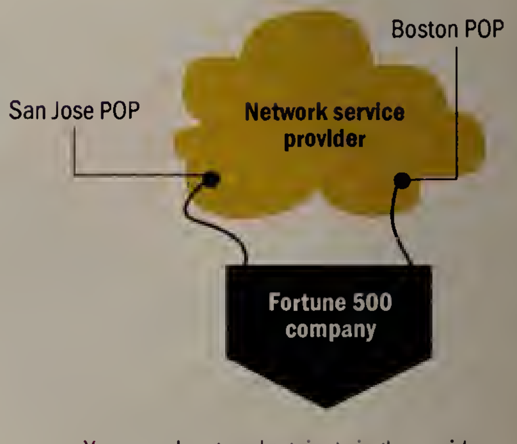
To some extent, Benjamin's wish has already come true. At the Summer Olympics in Atlanta, IBM used its WOMplex

See **Internet,** ***page 59***

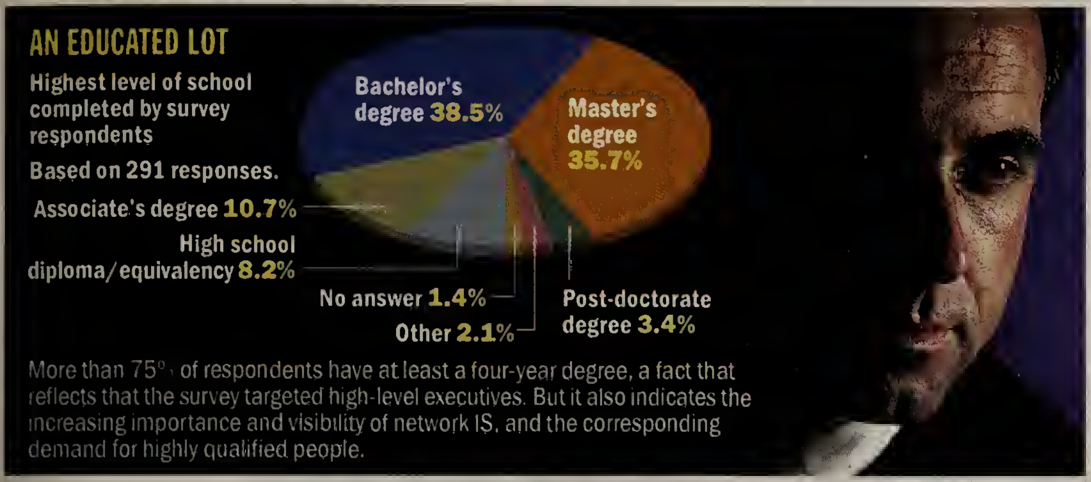
TWO WAYS TO KEEP YOUR 'NET LINK ALIVE



Companies may opt for connections to two or more Internet providers to distribute data loads, or maintain a hot connection to a backup provider to handle traffic in the event of an outage.



You can also guard against single provider outages by maintaining multiple physically divergent paths to different points of presence in the carrier's network.



More than 75% of respondents have at least a four-year degree, a fact that reflects that the survey targeted high-level executives. But it also indicates the increasing importance and visibility of network IS, and the corresponding demand for highly qualified people.

PHOTO BY SHAWN HENRY

Salaries

Continued from page 56

they have enough power and authority to exercise their strength."

Maintaining an exciting work environment is another oft-cited factor, and one that often comes down to effective project management. "You've got to do a reasonable job of project management and scheduling, so people feel like their time is being used well," Prince says.

Keever agrees. "The biggest problem is staying on a project till we complete it and not jerking people from project to project," he says.

Glenn James, a principal with Deloitte & Touche, says, "The companies I've seen that have been successful in attracting and keeping people have done a lot of things that deal with the non-monetary aspects of the job," he says. "That may include letting people do things like work nonstandard hours, telecommute, or if somebody has an interest in traveling, assign them to an international position for some time."

On the other hand, employees can help themselves become more valuable to the organization by being more business-oriented.

"If you're a network manager at a major corporation, you are the bridge between two sides of a lake," James says. "On one side are the people building TCP/IP packets, and on the other side folks are wondering what the stock price is. It's a pretty big distance between those two, and you've got to have a little insight into both sides."

Gerard Cunningham, another Deloitte & Touche principal, says bridging that gap can have a direct impact on compensation. "Finding ways to integrate the communications group with the rest of the business and show the value of it is likely to improve compensation [for the whole IT group] and deal with some of the job movement issues. That's what we see almost every day."

Korn/Ferry Reynolds has a word of advice for net managers: "Be a thought leader as well as a technical leader." A thought leader, she says, is someone who thinks about the contribution of a given project to the organization and what other projects can be built on top of it. In short, a thought leader is "someone who thinks about what he's doing to help his boss look good."

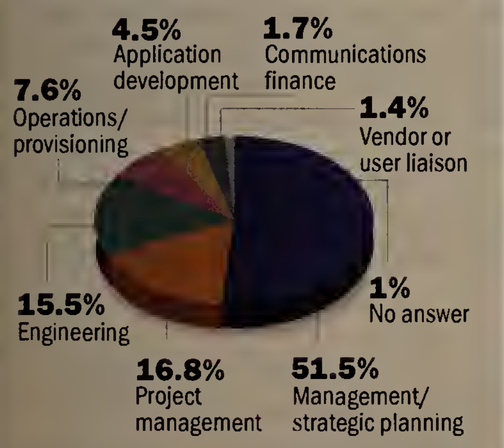
Long term, Cunningham says, the key to success is to "keep retooling. The hot hands in the marketplace from a compensation point of view continue to change and evolve. If you're the backbone network engineer and you're not familar with routable networks, you're in trouble."

But this change and evolution also amounts to opportunity, for those who choose to accept it.

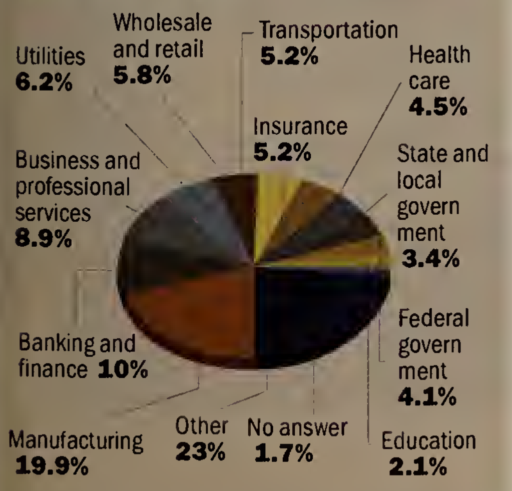
WHAT THEY DO

Respondent job function breakdown

Based on 291 responses



WHERE THEY WORK



ON LINE

Check out Network World Fusion for a Q&A with Deloitte & Touche partners Gerard Cunningham and Glenn James in which they offer an analysis of the survey findings. Enter the above number in the DocFinder box on the home page.

FIND IT ON FUSION 9304

Network World Fusion
http://www.nwfusion.com

Survey methodology

The 1996 Network World/Deloitte & Touche Salary Survey is based on 291 qualified responses from a randomly selected sample of the publication's subscribers and the Deloitte & Touche client base.

Only subscribers who specify, recommend or approve purchases of $10 million a year for network equipment and services and whose annual corporate gross revenue is at least $1 billion were invited to participate. The Deloitte & Touche lists consists primarily of North American companies with significant investments in communications technologies.

The survey requested respondents to provide salary and related information for themselves as well as the various titles that report to them. Information was collected using a four-page questionnaire mailed to *NW* subscribers and Deloitte & Touche clients in June, and to *NW* subscribers in August.

"It's a great time to be a technology professional," Schoff says. "The opportunities that exist today and that are likely to face people for the next 10 or 20 years are just phenomenal. I don't think there's going to be any end to it for quite some time." ■

Internet

Continued from page 58

technology to ensure that Web users would have access to game results.

John Patrick, IBM's vice president of Internet technology, says the vendor's Olympics Web site took 200 million hits over the two-week span, with a peak of 17 million hits on Aug. 1. "The performance was quite good," he says.

It should be. IBM runs its WOMplex on SP2 multiprocessor systems based on RISC System/6000s. During the Olympics, the company's primary site in Connecticut hosted 53 SP2 processors running in parallel, while a secondary site in New York had 16 nodes.

You may not have that kind of horsepower at your disposal today. But you can employ other tactics to improve your company's Web service to the outside world.

The InterNIC's Kosters says you should look into whether your ISP offers Web caching services. That allows Web-page data to be stored geographically, easing the load on any one server. "That's a big plus," he says.

IBM's Patrick says you might also want to consider outsourcing Web server operation to a company such as, well, IBM, which has the expertise and resources to manage WOMplex for the masses.

"The benefit is you can have at your disposal virtual Web space that you expand and contract," he says.

Outside of the Web, there are some other tactics you may want to employ to protect your organization against some of the Internet's reliability woes.

One rule of thumb, according to CIX's Brown, is to use a dual-homing approach to hooking your company to the Internet. Basically, that means having two or more connections to the Internet over physically diverse paths. This can be done through a single provider, or via multiple ISPs. The advantage of going with different providers is that if one suffers a networkwide outage, your company still maintains live connectivity to the 'Net.

Gordon Cook, editor of "The Cook Report," a newsletter on ISP activity, suggests that corporate users buying leased lines to connect a net larger than a few dozen hosts to the Internet should purchase service from an ISP directly attached to one or more traffic exchange points. These multihomed ISPs control huge address blocks, ensuring large corporate users that their IP addresses will remain intact. A smaller ISP, for instance, may lease circuits from a larger provider and be forced to give back addresses if it were to change carriers.

On a much broader scope, if your goal is to provide uniform Internet service to corporate offices around the world, you may be better off examining one of the major carrier's Internet services — such as MCI's Concert InternetPlus.

Multiple grades of service are available, and, according to MCI's Hagens, his company will coordinate your connections across different country sites and give you a single point of contact.

"You don't wind up dealing with a range of different ISPs in every country," he says. "And you know that the people who designed it have done so from a global perspective."

Clearly, ISPs are moving to improve conditions on the Internet. Many of them are at the mercy of Cisco, whose routers largely dictate whether service lives or dies. In its most recent announcement at NetWorld+Interop 96, Cisco showed the early outline of a plan to bring bandwidth reservation and QoS to the 'Net.

Initially, the new features will enable existing Cisco 7000 and 7500 routers to better manage the traffic and the ever-changing route status on the 'Net. But many of Cisco's key features won't be available for switches until mid- to late 1997. Shorter term, bandwidth upgrades to OC-3 and OC-12 will help but are only stopgap measures until more effective ways to price and allocate bandwidth arrive to help police unrestrained usage. And the Web will continue to slog along until some new whizbang version of the Network File System or some other technology comes along to smooth data flows.

So, if you haven't cut over those strategic applications just yet, consider waiting a bit longer or maybe dabbling with a private intranet. If you're one of the bold ones already running mission-critical applications on the 'Net, shield yourself against outages or sluggish performance as best you can by dual-homing to multiple providers. Nobody likes getting burned. ■

NetworkWorld PC WORLD

SERVER TEST SERIES

Old friends revisited

A monthly feature in which we evaluate file and application servers, based on tests conducted in a lab owned jointly with our sister publication, PC World.

This month we take a second look at two servers we tested in July. Data General Corp. has upgraded its AViiON AV 4900, replacing its 166-MHz Pentium Pro processors with 200-MHz models. The performance boost is spectacular, on the order of 20%, vaulting the 4900 to the top spot in performance among servers we've tested.

The Panda Project's futuristic Archistrat 4s was originally submitted as an enterprise server, and failed to impress. This time we looked at a workgroup configuration. While performance was down, price was way down, making the new server more palatable for workgroups but still no better than average.

ENTERPRISE SERVER

AViiON AV 4900

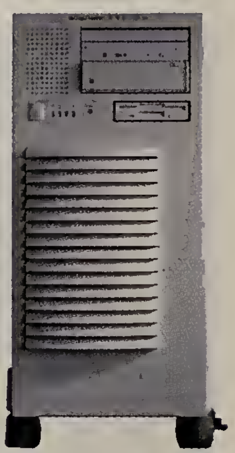
VENDOR: *Data General*

CONTACT: *(508) 898-5000*

PRICE: *$63,148*

PERFORMANCE RATING: *62.6*

PRICE/PERFORMANCE INDEX 1,010



A lower number indicates better value. The best ratio to date is 252 while the poorest is 1,215.

With upgraded processors and a larger CPU cache, Data General's AViiON AV 4900 effaces the poor performance turned in by its older Pentium Pro sibling.

According to Data General, Intel Corp. has fixed some problems with its Pentium Pros so all the power of the CPU is unleashed. This AV 4900 has zoomed to No. 1 in Windows NT file server performance (27% faster than the 166-MHz version) and Lotus Development Corp. Notes performance (23% faster) without losing ground in the Oracle Server 7.22 test (still No. 2). Apparently, Oracle was bottlenecked somewhere other than in the processor, as is common with many server applications.

This is the same AViiON/CLARiiON combination we looked at in July (*NW,* July 22, page 40), but with four 200-MHz Pentium Pro processors in place of that model's 166-MHz CPUs. It's a combination that makes for some serious redundancy.

The AViiON has three hot-pluggable power supplies, while drives are provided in the separate CLARiiON housing. CLARiiON provides dual redundant paths to the hot-swappable SCSI drives — two controllers in the AViiON, two controllers in the CLARiiON and two cables between the two. The drives can be configured for RAID 3 or 5.

With recently announced NT Clustering, you can create a server that only a natural disaster could take down. And with NT Alert software, which can be configured to page you when server parameters move out of line, you can be alerted to any trouble long before a user notices.

Data General also bundles Hewlett-Packard Co.'s OpenView with the server, allowing you to manage your AViiON and CLARiiON along with your switches, hubs, routers and such.

Although still pricey, the $63,148 server is a much better value than its 166-MHz predecessor.

With the included support of Data General's field engineering staff and the server's reliability features, the AViiON 4900 is an excellent value for companies with the need for nonstop speed.

WORKGROUP SERVER

Archistrat 4s Server

VENDOR: *The Panda Project*

CONTACT: *(407) 994-2300*

PRICE: *$8,159*

PERFORMANCE RATING: *32.4*

PRICE/PERFORMANCE INDEX 252

A lower number indicates better value. The best ratio to date is 252 while the poorest is 1,215.

We reviewed the Archistrat 4s in our July 22 issue as an enterprise server at the vendor's request. But The Panda Project says the machine was designed as a workgroup server, so the company sent us a new configuration and, ever the diplomats, we tested it again. It turned in only average numbers for both performance and price/performance.

The performance of the Archistrat 4s as a file server suffered because Panda provided a single 4G-byte drive

PERFORMANCE LEADERS TO DATE

Our performance rating is derived by adding the file server performance in scripts per minute to the average of the two application server test results at the 16-client level.

Enterprise servers	Issue tested	Top performance
Data General AViiON AV 4900	This issue	62.6
HP NetServer 5/166 LS4	5/27/96	55.4
ALR Revolution Quad6 166/512	7/22/96	54.8
IBM PC Server 720	5/27/96	53.1
Data General AViiON AV 4900	7/22/96	51.1
Workgroup servers		
Compaq ProLiant 1500 5/133 Model 2100	6/24/96	45.8
Digital Prioris XL Server 5133	4/22/96	41.5
Digital Prioris HX 5166	8/19/96	41.4
HP NetServer 5/133 LH	2/19/96	38.6
AcerAltos 900	6/24/96	36.5

VALUE LEADERS TO DATE

We divide the price of the server as tested by the performance rating to get our price/performance index. A lower number indicates better value.

Enterprise servers	Issue tested	Price/ performance index
Tangent Carthage	5/27/96	407
IBM PC Server 720	5/27/96	518
HP NetServer 5/166 LS4	5/27/96	531
ALR Revolution Quad6 166/512	7/22/96	603
The Panda Project Archistrat 4s Model 300	7/22/96	747
Workgroup servers		
Digital Prioris XL Server 5133	4/22/96	143
AcerAltos 900	6/24/96	147
Dell PowerEdge SP 5133-2	5/27/96	161
Unisys Aquanta ES	7/22/96	173
Compaq ProSignia 500 Model 5/120-2100	2/19/96	175

rather than a pair of 2G-byte drives that the operating system could span. The scores for the Notes and database parts of our test suite are respectable, pointing to good processor and PCI subsystems. With a pair of SCSI drives rather than a single drive, this machine would likely have been an excellent performer.

In our previous review, we noted the server's futuristic design, perhaps its most obvious feature, but found it difficult to access its internals. The special processor, memory and I/O boards all use Panda's unique Compass connector to the backplane. Unlike most EISA/PCI-bus servers we test, the Archistrat offers only ISA and PCI.

Download complete server test results and more details of our test methodology.

FIND IT ON FUSION 9306

Enter the number above in the DocFinder box on the home page.

The huge price difference between the vendor's last server and this one is due to a reduction in the number of disk drives included, lower memory prices and the typical ongoing price reductions common throughout the industry.

The Panda Project says it can upgrade its server to a Digital Equipment Corp. Alpha-based motherboard, but this is not terribly useful since that would mean upgrading all the software as well — you might as well buy a new computer.

However, this does demonstrate the versatility of the hardware and is a good indication that Panda will come through on its promise that the server will be upgradable to the next-generation Intel chip.

At $6,364, this is a decent server and an excellent choice if you're looking for longevity. The minor glitches in design warrant Panda's attention but shouldn't be viewed as serious enough to frighten you away from the Archistrat 4s.

The owner's guide is published by Panda and is basic enough to get a novice up and running, while also providing sufficient information to help more seasoned server administrators. Their printed documentation comes in a box that makes for handy storage. The Cogent Data Technologies, Inc. network interface card, Adaptec, Inc. SCSI adapter, video card, hard drive and ISA Configuration Utility software all come with OEM documentation.

The Archistrat 4s Server lacks management software that is required to give it a place in any organization that has more than a few servers.

However, the diagnostic program is a nice touch — it'll help you solve some problems on your own, reducing time spent on the phone with technical support.

CALLING ALL VENDORS

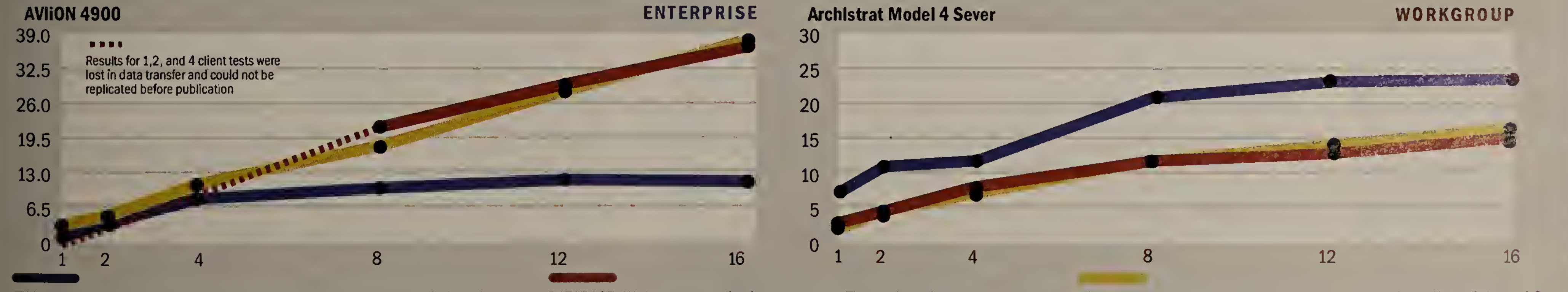
We invite and encourage all vendors of file and application servers to participate in our Server Test Series. For information on how to be included, contact the director of the Network World/PC World Server Test Center, Bill Rinko-Gay, at (713) 376-8771 or bill_rinko-gay@pcworld.com

The inside story

Vendor	**DataGeneral**	**ENTERPRISE**	**The Panda Project**	**WORKGROUP**
Model	AViiON 4900		Archistrat Model 4s Server	
Processor	4 200-MHz Pentium Pros with 512K-byte Level 2 cache		166-MHz Pentium with 512K-byte Level 2 cache	
Max. processors	4 200-MHz Pentium Pros		Dual 200-MHz Pentium Pro or 366-MHz DEC Alpha with 512K-byte Level 2	
Memory	**As tested**	**Maximum**	**As tested**	**Maximum**
	128M bytes	4G bytes	32M bytes	1G byte
Slots	**Provided**	**Open**	**Provided**	**Open**
EISA	4	2	0	0
PCI/EISA	0	0	4	3
PCI	6	0	2	0
Processor	2	0	1	0
ISA	0	0	0	0
Bays	**Provided**	**Open**	**Provided**	**Open**
Internal	0	0	12	10
External	3	1	4	2
Storage				
Adapter	2 SCSI-2 Symbios 8251D differential and CLARiiON storage processors		Adaptec 2940UW	
Bus	PCI		Fast & Wide SCSI-2	
Capacity	18.9G bytes		4G bytes	
Model	Seagate Barracuda ST12550N		Seagate Barracuda ST15150W	
Maximum drive capacity	**Internal**	**External**	**Internal**	**External**
	0	5T bytes	48G bytes	
CD-ROM	Toshiba XM5401B 4x SCSI		Sony CDU 76S 4x SCSI	
Network adapter	4 DEC 100M-byte Ethernet DE500s		Cogent EM110TX PCI	
Fault tolerance features	Redundant cooling and power, NT Alert to warn of alert situations, I/O failover to CLARiiON, RAID5, hot pluggable drives, redundant subsystems, mirrored write cache		ECC memory, hot swap drive option, RAID controller option	
Security features			Power-on password, keyboard password, diskette drive control, diskette drive boot control, network server mode, parallel and serial interface control, administrator password, disk configuration lock	
Bundled software	X/Open		NetWare 3.12, 4.1, SFT III; Microsoft Windows NT Server and Workstation 3.51; IBM OS/2 Warp; SunSoft Solaris; Caldera Linuz; SCO Unix, UnixWare	
Miscellaneous	HP OpenView for unit management, Array Manager for CLARiiON management, Prophecy for CLARiiON performance tuning, NT Alert		QA/Plus 2 Diagnostics; ISA Configuration Utility	

PERFORMANCE SUMMARY

We measure performance from the client's point of view and report the time it takes to complete typical tasks. Our performance summary graphs show the results of each test in scripts per minutes, with numbers of clients ranging from one to 16. Because the tests run faster than a real client could perform the operations, each of our test clients stresses the servers as much as several real users would.



FILE SERVER Our file server tests run scripts on ascending numbers of clients for four applications: Microsoft's Word and Excel for Windows, Lotus' 1-2-3 for Windows and Corel's WordPerfect for Windows. The scripts perform file-access operations, such as opening, importing and saving files.

DATABASE We have two application server tests. The first is a client/server database test that uses Microsoft Access on the front end and Oracle Sever 7.2.2 on the back end. We perform various read and write operations on a three-table payroll management application.

LOTUS NOTES The other application server test uses Lotus Notes Release 4.0. We access multiple views in a database, then each document within each view.

Briefs

DKSystems, Inc. *has released* **OnTrack for Training 4.1.** *The latest version of this training administration and management package has a new report generator that will make it easier for users to design and analyze course development, planning and scheduling, student skills tracking, certification and tuition reimbursement reports. Those reports can be exported to various applications.*

Additional enhancements include a new print option that lets users print any list displayed on a list screen, the ability to view both sort and selection screens simultaneously, and improved security options.

OnTrack for Training 4.1 costs $2,495 for a single user and $8,495 for five users.

DKSystems: (800) 892-5332.

Prosoft, Inc. *will establish a training site at the* **National Technology Group (NTG)** *headquarters in Research Triangle Park, N.C. The partnership will enable Prosoft, an Internet training firm, to offer courses at all levels to businesses in the Southeast. The site will feature a state-of-the art classroom connected to the 'Net via a T-1 link and equipped with 25 Pentium-based systems. Systems integrator NTG will use the facility for internal Internet training as well as vendor-specific training.*

Prosoft: (801) 779-0160.

UNIX EXPO Plus *will be held in New York* **Oct. 7-11.**

Conference tracks include Unix and Windows NT products and strategies, distributed and client/server computing, Unix and Windows NT application development and integration, Unix and Windows NT systems and network management, and Internet/intranet strategies. The full conference cost is $1,195; other packages cost between $250 and $895.

UNIX EXPO Plus: (888) 253-6434, Ext 9125.

Take it or leave it

Here's some help to determine if a job offer is good enough.

By Frank Schoff

There it lays before you, the one thing you most wanted to get after all that resume writing and interviewing: a job offer.

You think it's the job for you. Your prospective employer likewise believes you are the best person to get the job done.

But before you accept the offer, you'd be wise to take the time to thoroughly evaluate it.

Other factors to consider

When evaluating a job offer, don't overlook these subtle yet important factors:

Health care benefits costs

Since most health care plans now require an employee contribution, be sure to understand the difference between what you pay for coverage today and how much you will need to contribute at the new job. Those differences can be substantial.

Cost-of-living differentials

There are major differences in what it costs to live in various areas of the U.S., and those differences impact compensation. Interestingly, most job hunters expect an upward cost-of-living adjustment if they move from, say, Kansas City to San Francisco, but aren't willing to accept a downward adjustment for a move in the opposite direction. You should be prepared to make an adjustment either way if you relocate. If you are working through a reputable recruiter, that person should be able to give you cost-of-living data for your present and prospective locales. Most large libraries should have fairly current cost-of-living comparisons by region and for major metropolitan areas.

State and local taxes

You know you have to pay them, but the type of taxes varies widely from state to state. The most visible state tax is the one on income, and many job hunters focus solely on that when considering an offer. What you should look at is the per capita tax burden, which reflects a composite of all state taxes. For example, in 1993, North Carolina had a state income tax of 7%, and a per capita tax burden of $3,729. Florida had no state income tax, but a per capita tax burden of $5,880 that same year. The numbers are a little dated but they illustrate the point.

In general, if the costs associated with these factors eat up 5% of the salary you've been offered, you should seek a higher offer. Don't worry about it if the costs take less than 5% of the offer and you still come away making more in the new job.

Job offers frequently give rise to uncertainty and raise more questions than they answer. This is particularly true for job hunters who don't see enough job offers to become highly proficient in dealing with them.

Still, the answers to some common questions can help you figure out if the offer is right.

Assessing the offer

For most positions, the salary you're offered is dictated by three factors: the general value of your skills in the local job market; the prospective employer's perception of your value to the company; and your current paycheck.

When it comes to placing a value on your skills in the local job market, you should look at local-market salary surveys. That's what your prospective employer has most likely done to establish a salary range for positions that require your skill level, although employers may not release the results of surveys they have funded.

You can contact local human resource associations or the local chapter of a network professionals organization to locate such surveys.

The local chamber of commerce or library might also have them. If you can find a survey, and it's current, the information will usually be reasonably accurate. Trade publications are another source of up-to-date salary survey data, and *Network World* is no exception (see page 52).

If you can't locate such surveys, ask your prospective employer for the position's salary range. It's a legitimate question, but there's no guarantee that you'll get an answer. Also, be aware that in a rapidly changing job market such as networking, the survey data can become out of date in six to 12 months. Understand that salary ranges within a region can vary widely — 10% to 20% — based on cost-of-living variations.

But your best bet might be to conduct your own survey. Read the local classified ads and contact peers, network managers with companies in the area, or local recruiters. You'll find that most will be willing to help, and you may even uncover a job lead that's better than the one you're considering.

Finding out how valuable your prospective employer considers you to be isn't as difficult as it seems. Paying attention during interviews can give you some sense of your value as well as the value of the position to the company. You should know the answers to these questions:

- Are you the only candidate under consideration in the final stage, or are there others?
- Is the position unique, or are there several other people doing similar work?
- Is the position vacant? If so, how long has it been open?
- What are the consequences to the company if the position remains open?
- Are you uniquely qualified for the position?

Knowing the answers to these questions will better enable you to anticipate where in the salary range you might fit and whether or not you have negotiating leverage.

Factoring your current salary into the job offer can be frustrating, especially if you don't know the relationship between your existing paycheck and the value of a future position. But this isn't rocket science. You should understand that current compensation is a measure of the market value of your skills. Therefore, a position requiring similar skills should yield a salary range that is similar to your own. This assumes there are no cost-of-living differentials or other factors (see graphic).

Using your current compensation as a benchmark, you can expect an offer that provides financial growth but stays within the market range for your skill set. Generally, offers tend to be within 15% of current compensation.

For high-demand skills, offers that are 20% or more above your current salary are not out of the question.

To get more job hunting advice from Frank Schoff, visit Network World Fusion. You'll find articles on how to develop a career network, how to get career development guidance from your boss and how to audit your career development plans.

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Should I negotiate?

Before answering that question, let's look at some guidelines on when not to negotiate.

- Don't negotiate unless you are willing to run the ultimate risk of losing the offer.
- Don't negotiate if the offer falls within your predefined acceptable range. In short, don't be greedy.
- Don't negotiate for more money if you're trying to offset shortcomings in other areas such as job content, location, company culture or chemistry with your prospective boss. No amount of money will buy satisfaction in those other areas.

So when do you negotiate? When you really want the job and the initial offer falls short of your preestablished acceptable range; when you can put a realistic counterproposal on the table and support it with sound reasoning; or when you would not accept the original offer if the company holds firm.

Is this the best offer?

In short, you will never know if this is the best job you could have found, just like you will never know if you've negotiated the best price for a house or a new car. If the offer and the other factors, such as job content, geography, growth potential and fringe benefits, satisfy your requirements, accept it. Satisfaction is the key; the rest is irrelevant.

Schoff is president of Management Recruiters in Cedar Mountain, N.C., and specializes in the placement of networking professionals. He can be reached at (704) 884-4118 or by fax at (704) 884-3512.

Cyber-space with no organizing force to register the identities and locations of the millions of users who bring the Internet to life. A daunting and vital task of this magnitude required a resource with unparalleled expertise and experience in the most complex areas of network technology.

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CHIEF TECHNOLOGY OFFICER - Dynamic and articulate individual with established ties to the technology community. Must have Internet and Product Development experience as well as UNIX, C, NT, HTML, SUN, HP and MS hardware/software experience.

SENIOR SYSTEM ADMINISTRATORS - Develop and maintain C, C++, PERL and Shell scripts for UNIX system administration. Configure and maintain Sendmail, CISCO routers and SUN servers/workstations. Requires 1+ year SunOS, Solaris 2.X and/or Intel BSD system administration experience as well as knowledge of UNIX network security, Internet routing, DNS and IP networking. Relational database experience (INCRES, Oracle, Informix) and familiarity with TCP/IP and Internet tools (FTP, TELNET, web browsers) desirable.

NETWORK MANAGEMENT ENGINEERS - Provide management, performance, and capacity planning support through the development, deployment, and operation of complex distributed network management and performance systems and tools. Desirable experience includes: UNIX, HP OpenView, SunNet Manager, SunOS, Cshell, C, SynOptics Optivity, Cabletron LANView or Spectrum, Wellfleet Site Manager, Cisco Works, SNMP MIB v1/v2, NIS DNS, TCP/IP, and RMON.

NETWORK MANAGEMENT ARCHITECTS - Design and implement cost effective and efficient network management service solutions and architectures within given client parameters. Must possess working knowledge of network management service areas: Fault, Configuration, Accounting, Performance, Security Management. Should also have experience in any of the following areas: SNMP proxy, HPOV, SunNet Manager, System View AIX, SMS, SNMP v1/v2, RMON I/II, TCP/IP protocol suite, Shared LAN, Fast packet LANs, Frame Relay, Routing Protocols, and UNIX.

IP NETWORK DESIGNERS - Analyze client requirements and recommend, install and configure hardware/software. Design IP networks and migrate existing networks to IP. Knowledge and/or experience in the following areas required: TCP/IP (router protocols, firewalls, numbering), LAN/WANs, RMON, DHCP, BOOTP, C, UNIX Shell Script, PERL, ADP, and Cisco/Bay Networks/Wellfleet Routers.

IP SYSTEMS INTEGRATORS - Analyze client requirements and recommend, install and configure hardware/software. Design, install and operate TCP, DNS, SMTP servers, SMTP gateways to COTS email systems, UNIX system deployment and UNIX system security assessment. Knowledge and/or experience in the following areas required: UNIX, TCP/IP, DHCP, C, UNIX Shell Script, PERL, SMTP, and ADP.

WEBMASTERS - Design and maintain Web pages/servers. May also install and configure Web servers (SUN) and software. Must have experience in the following areas: UNIX and/or Windows NT script development (C Shell, PERL, TCL, etc.); commercial HTTP server software installation and maintenance; UNIX systems administration.

SOFTWARE ENGINEERS - Provide software development and maintenance of C, C++, OOP, OOD, PERL and embedded SQL applications under UNIX as well as TCP/IP client/server networking. Develop TCP/IP services protocol and network security. Must have a minimum of 2-3 years C/UNIX software development experience as well as knowledge of SunOS, Solaris, BSDI UNIX system administration and UNIX network security. Must have knowledge of Internet routing, DNS, and IP networking services as well as familiarity of TCP/IP and Internet tools such as FTP, TELNET and web browsers. Relational database experience (INGRES, Oracle, Informix) desirable.

NETWORK MONITORING PERSONNEL - Will monitor our large-scale network operations. Must be able to work flexible hours. Should have experience in the following areas: UNIX, HP OpenView, SunNet Manger, IBM NetView, NetView/6000, TCP/IP, Windows NT/95, and Mac/PC graphics software (Photoshop, Illustrator, etc.)

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If unable to attend the show, please send your resume and salary requirements, indicating position of interest, to: **Network Solutions, Inc., Dept. NW-IY, 505 Huntmar Park Drive, Herndon, VA 22070; FAX#: (703) 742-4837; email: ivany@netsol.com** EOE M/F/D/V.

For additional job opportunities and information, see our home page at http://www.netsol.com or the SAIC home page at http://www.saic.com

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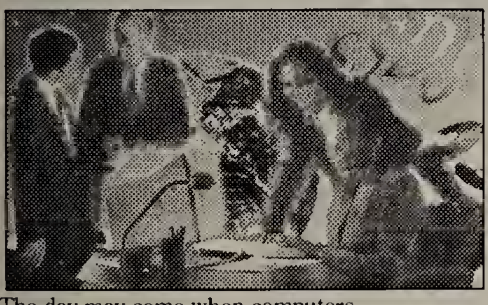

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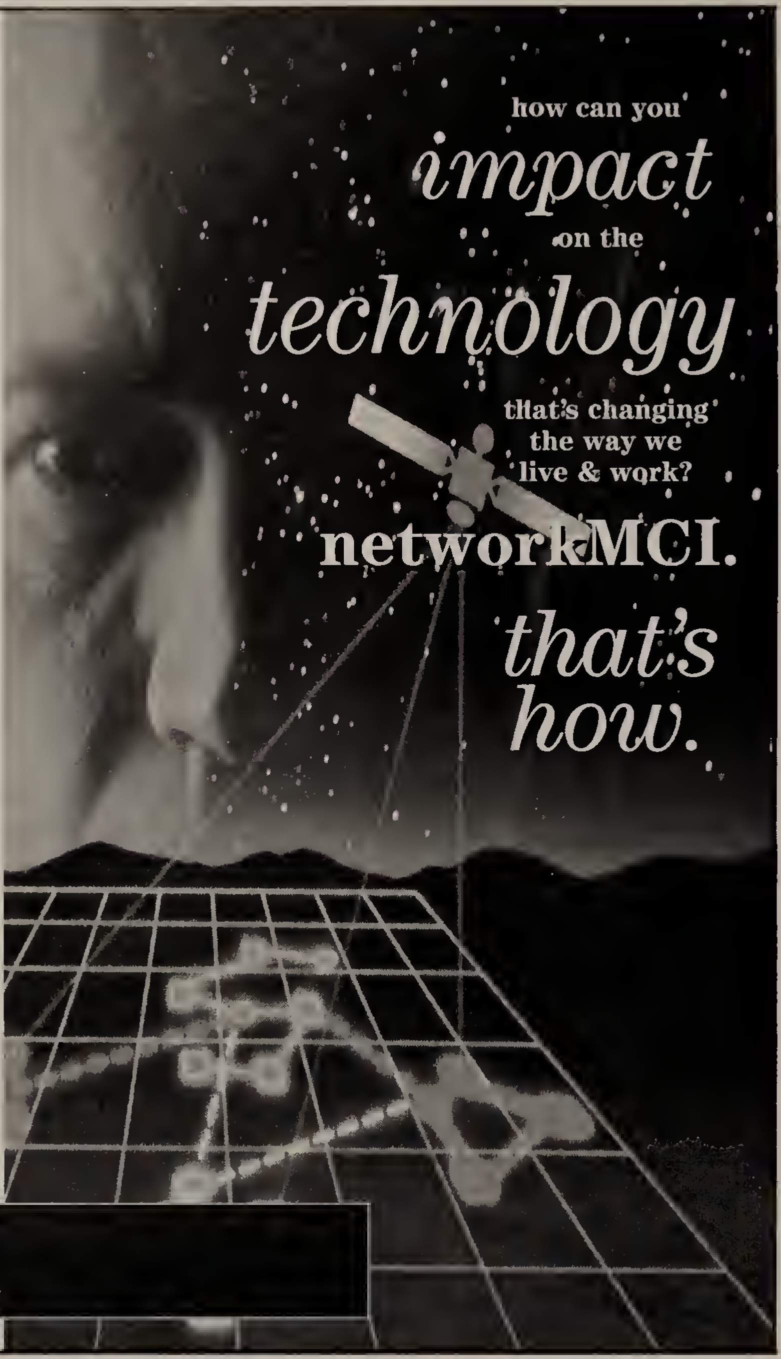

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SENIOR DATA NETWORK ANALYST

Design and implement router technologies for LAN/MAN/LAN applications. Southeast, $50-70K.

SENIOR NETWORK TECHNOLOGIES SPECIALIST

Design, develop, and implement data network solutions for multiple divisions of U.S. based international mfg. organization. Internal consulting position. Midwest, $60-80K.

MANAGER, DATA TRANSPORT ENGINEERING

Manage design and implementation of carrier based data network transport services to include frame relay and ATM. Maintain cost effective network configurations. Support sales and marketing in product/service development. Mid Atlantic, $75-100K.

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Manages group responsible for optimizing performance of ACD, VRU, and CTI technologies for leading financial services organization. Prior AT&T Definity product experience required. Mid Atlantic, $70-90K.

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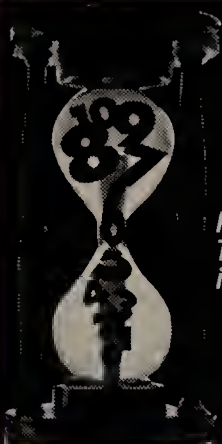

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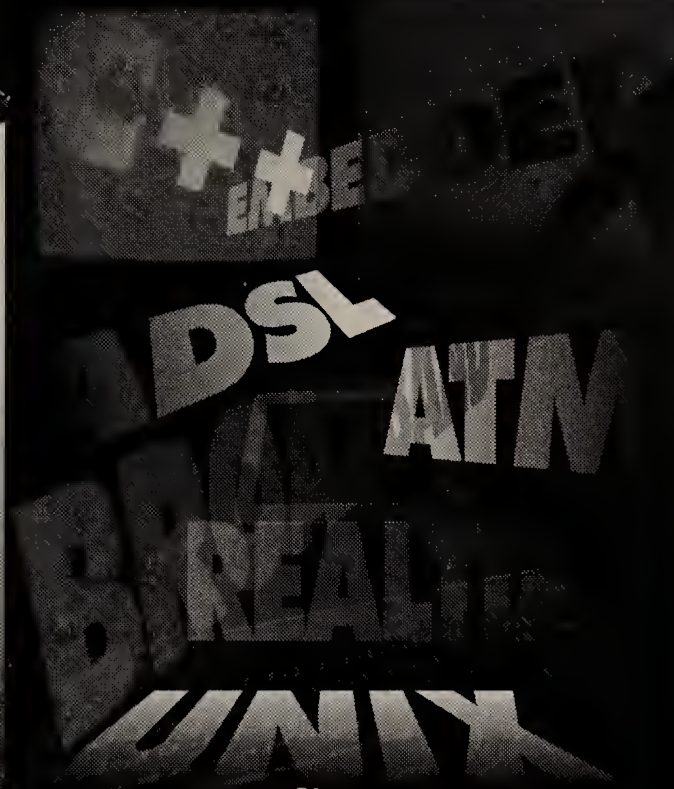

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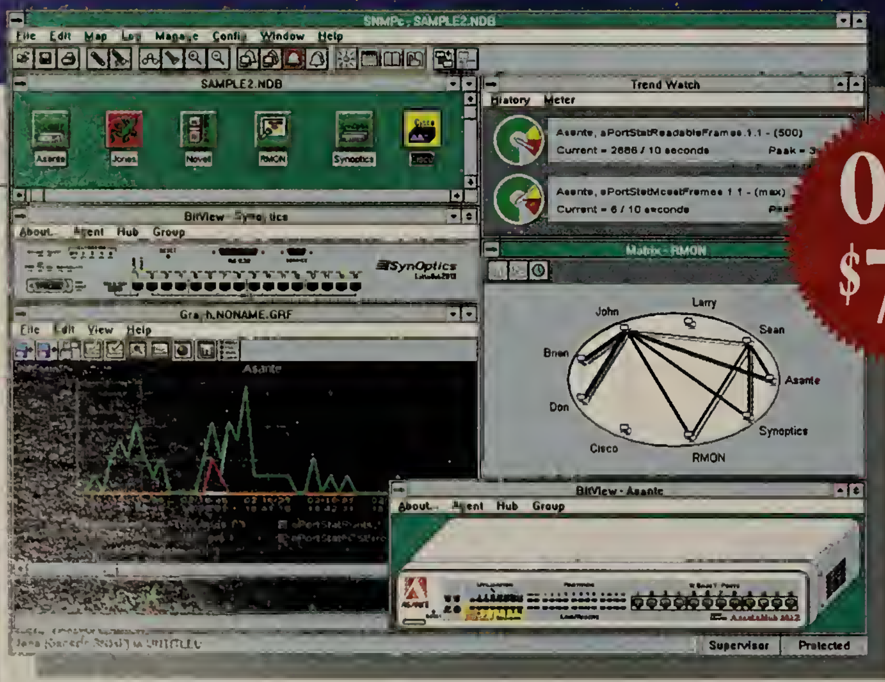

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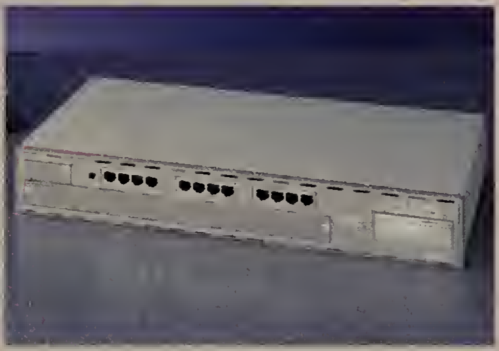

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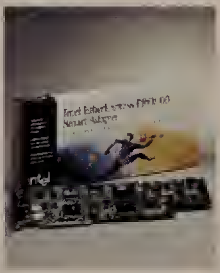

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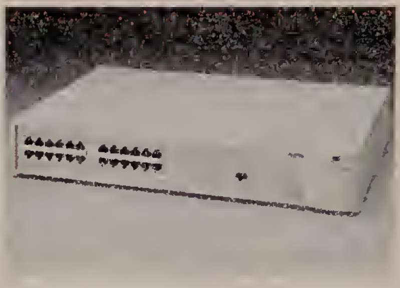

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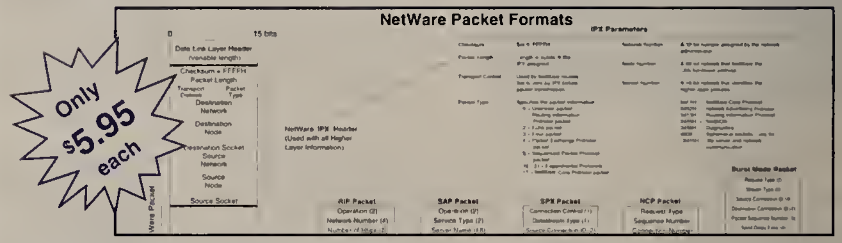
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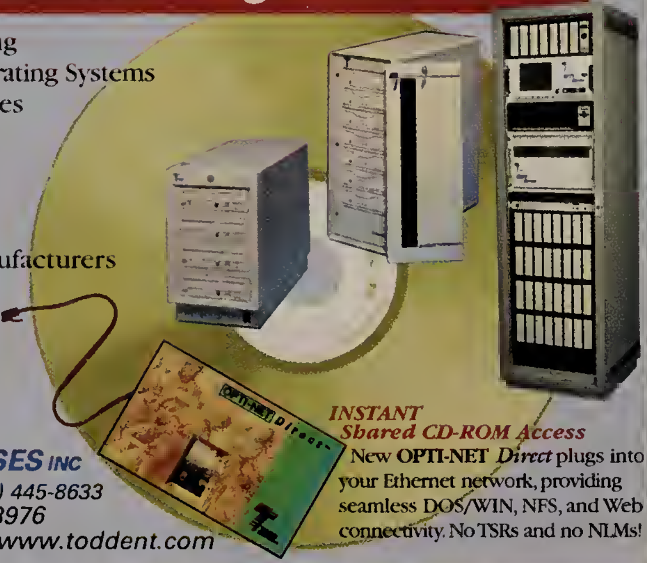

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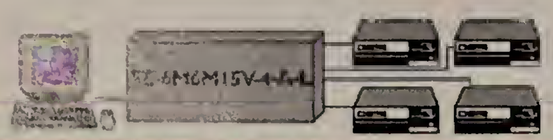

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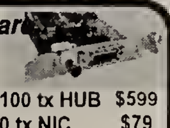

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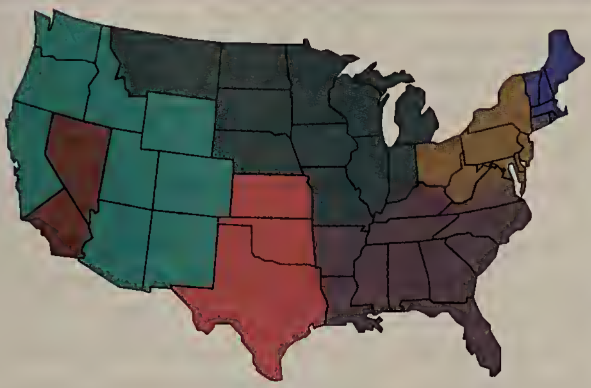

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Cabletron

Continued from page 1

that fits into the Multi Media Access Center-Plus (MMAC-Plus) backbone switch and the MMAC-Plus 6 wiring closet chassis. Each module supports as many as 16 155M bit/sec ATM ports or eight 622M bit/sec ATM interfaces, and boasts a switching capacity of 5.4G bit/sec, according to sources close to Cabletron.

The technique is relatively simple. The SmartCell module attaches to an internal ATM backplane, called the cell transfer matrix (CTM), which can be added to both MMAC-Plus models through a rear slot on the chassis.

The SmartCell device gives Cabletron one of the most powerful ATM switches on the market, with a higher switching capacity than competing products from FORE Systems, Inc. and Cisco Systems, Inc., industry observers said.

When fully loaded with 14 SmartCell modules, the MMAC-Plus can support as many as 224 155M bit/sec ATM ports and 112 622M bit/sec ATM interfaces, and offer more than 75G bit/sec in overall switching capacity. Also, each board can support 128,000 switched virtual circuits for a total of more than one million SVCs in a fully configured MMAC-Plus.

Cabletron's current top-of-the-line ATM backbone switch — the SFCS-1000 — is a 10G bit/sec switch the company licenses from FORE. Those devices are not neglected by the new Cabletron plan.

In fact, customers will be able to feed several SFCS-1000 switches into the Cabletron-developed SmartCell device, which will form the core of the enterprise backbone.

Cabletron's ATM strategy

Enterprise backbone: SmartCell ATM 5.4G bit/sec switch module for the MMAC-Plus and MMAC-Plus 6 chassis; plugs in to the cell transfer matrix ATM backplane; developed by Cabletron.

Data center: SFCS-1000 10G bit/sec stand-alone ATM switch; licensed from FORE Systems.

Wiring closet: SFCS-200 2.5G bit/sec ATM switch module for the MMAC-Plus family; jointly developed by Cabletron and FORE.

Workgroup: SmartCell ZX-250 family of 2.5G bit/sec ATM switches; developed through Cabletron's acquisition of Zeitnet.

Long-range planning

Although analysts agreed that SmartCell is overkill for most users' backbone bandwidth needs today, they pointed out that the device will be able to carry customers a long way into the future.

"These ATM switching capabilities for the MMAC-Plus [family] give customers a product that will take them at least into the next century and will probably even last for another 20 years," said Karl Shimada, vice president of market research at Rising Star Research, Inc., a Denver-based consultancy.

Other features that set the SmartCell apart include Layer 3 switching capabilities and full redundancy and management for every module, sources said.

SmartCell is expected to be officially announced at the upcoming NetWorld+Interop show in London.

The module will be generally available in the second quarter of 1997, but pricing has not yet been set.

Network World has also learned that Cabletron plans to use the London show to roll out the SmartCell ZX-250 family of 2.5G bit/sec ATM switches. The devices, which are a result of the company's July acquisition of ZeitNet, Inc., are designed to support the aggregation of traffic from traditional LAN workgroup switches as well as from directly attached ATM power users.

Pricing and availability information for the ZX-250 family is not yet available.

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Microsoft

Continued from page 1

area, industry observers said.

Novell, Inc. has been especially feisty. The company last week took out full-page ads in national newspapers challenging Microsoft to a directory showdown here. It also demonstrated Tabasco, agent software due by year-end that runs on NT Server and synchronizes user information residing there with data residing in Novell Directory Service (NDS).

In addition, Novell officials have said they will deliver NDS on NT by next summer, a full six months before Windows NT 5.0 is expected to arrive. Microsoft's goal is to deliver directory service technology in Windows NT 5.0 that is scalable, manageable and easy to use.

"Our goal with this new directory service is to completely separate the logical view of the company from the physical location of users and servers," Allchin said.

"Our goal with this new directory service is to completely separate the logical view of the company from the physical location of users and servers," Allchin said.

It will let an administrator set up a hierarchical directory based on a company's business model and define access rights to groups of users regardless of whether they are physically working at the same site.

Jason Perlow, a consulting engineer with New Technology Partners, Inc., a systems integration firm in Bedford, N.H., attended Allchin's presentation and was impressed with the directory prototype, both from a planning and ease-of-use standpoint. "Right now, there is a lot of complex planning involved in deciding how you want to set up the domain model in your company and then reengineering the existing NT directory service to cross over between those domains," Perlow said. "This new distributed directory is so much easier because you look at your company's organizational chart and that is how you set up the directory tree. Your distributed servers and users simply become objects in that tree that are accessible by rights that you define."

Allchin's demonstration showed a directory tree — which customers said closely resembles a Banyan Systems, Inc.'s StreetTalk directory tree — with only three levels of hierarchy, representing the company, departments and users. However, Windows NT Server product manager Jeff Price said the new service can support as many as 20 levels of hierarchy.

"We just let a company set up the tree according to how their business units are divided. We expect that the typical scheme will be about four levels," he said.

Allchin said customers will be able to browse the trees through a standard Web browser. For more granular directory control, administrators will use Slate, a graphical systems management console scheduled to ship with NT 5.0. Using this console, which will also be accessible via a Web browser, administrators can add, delete and move users and define rights to individuals and groups.

Allchin demonstrated how the new directory allows a network manager to simply assign limited administrative rights to end users who may have some network management duties within a certain department or branch office. Using Slate, Allchin defined administrative rights to an end user in a department, thereby giving him control over all objects located below him in the tree but not above. Allchin said this will remedy security concerns that arise when administrative rights are granted across domains in the current NT directory service.

Microsoft also showed how easy it will be to combine user information from different directory trees by dragging and dropping a segment of one tree into another using Slate. ■

Barksdale

Continued from page 1

conference. And I understand most of those people didn't chant that. The only ones that chanted were Microsoft people when [Microsoft Senior Vice President Steve] Ballmer tried to get this cheer going. I don't know if he really believes he wants to kill us. If he does, that is not exemplary behavior for a company that's so dominant.

ON LINE
Read the full transcript of our interview with Netscape's Jim Barksdale.
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After months of great press, you've now got people talking about whether you can survive. How do you deal with that shift in view?

All cycles go up and down. When you're the little darling, everybody writes good things.

What are some key market areas you wouldn't get into?

Anything other than intranet software. We're not going to be trying to build a lot of other types of telecommunications software that are not dependent upon Internet standards, or applications that don't run on those.

If the trick for developers is staying ahead on innovation, it would seem that the company that has more bodies and R&D (Microsoft) has the advantage.

There are certainly advantages to having resources, but as Voltaire said, "God is not on the side of the big battalions, but on the side of the battalions that can shoot straight."

Everyone talks about competition for the Internet in terms of Microsoft vs. Netscape. What don't you think we understand about the real competitive landscape out there?

That it isn't a browser war. That's where most of the press is. Netscape's principle revenue and future are dependent on our ability to create and implement great client/server open software solutions for businesses. But the game is not going to be won and lost, despite what some might say, on relative market share of the client.

You have been accused of being difficult to deal with as a partner. Is this is a valid criticism?

It's one of those things that persists in some circles. A lot of that, of course, comes from Microsoft. You go to Microsoft, they say, 'Well, they're hard to do business with.' They tend to spread those things.

What I always say is, 'Name me three developers that have told you personally that I was hard to do business with.' I will go talk to them and work with them and I will find out.

Do you have any interest in acquiring Novell?

No. No. No. Have no, had none, have had no discussions, no interest, no desire.

If AT&T Chairman Bob Allen called and said he'd line you up for that CEO job, would you take it?

It's not a CEO job. It's the No. 2 job.

What if he promised the CEO job to the No. 2 executive?

I wouldn't talk about something like that.

What do you say to people who want to write Netscape's obituary?

Get a life.

This interview was conducted by NW *Editor in Chief John Gallant and Senior Writer Carol Sliwa.*

Netscape

Continued from page 1

than others.

Take Chris Holten, for example. A year ago, as a member of a then-three-person PR staff, she found herself fielding so many calls that she often felt she couldn't tear herself away from her desk for lunch or bathroom breaks. “You've got to be able to be flexible to work in an environment like this, because sometimes it can be unstructured,” Holten said.

At times, Netscape employees have been asked to share cozy cubicles with one or even two of their colleagues in a game of corporate musical desks.

Members of the marketing department once got moved upstairs, downstairs, then back upstairs again within a nine-month time span, as employees shifted around to make room for newer colleagues.

The company roller hockey team finally settled into a former basketball court at the far end of the Netscape frontier, just yards from a road project that stands as the only barrier to the company's eastward sprawl. Who among them could have envisioned, back in the good old days of 1994, that they'd expand this much, this fast?

“We had 11,000 square feet and 13 people, and we said, ‘Oh my God, it's a barn. We'll never fill it,’ ” said Tom Paquin, 35, one of the founding engineers, remembering the May 2 opening of the company's doors.

“That 11,000 square feet was supposed to last 18 months,” laughed Employee No. 21, Greg Sands, a product manager who also likes to unwind on wheels. “Three months later, it was chaos.”

Today, with 1,300 employees in the fold, employees can focus more on their jobs, but they'll tell you there's still more on their plates than they can handle.

“The biggest decision you have to make every day is what not to do,” Sands said. “You have 10 things to do and you can only do five.”

It's Netscape time!

And Netscape developers must do these things fast. The industry calls these expedited product schedules Internet time, but in Mountain View, Calif., they've worked out a different sort of formula for what they refer to as “Netscape time.”

Some of the engineers decided to poll their fellow employees to investigate the time distortion phenomenon they were experiencing. Although it wasn't quite like Newton writing the laws of gravity after watching an apple fall, they did manage to reduce their new reality to a simple formula: one 12-month calendar year translates to four Netscape years.

As a result, employees say they feel they've been working at the company far longer than they actually have been.

Guarding against burnout has to be a concern. Stories abound of software engineers working long into the night, eating junk food and napping on futons in between shifts of pounding out code. But, employees say, Chief Executive Officer Jim Barksdale has been a settling influence since joining Netscape in January 1995. Or, as he puts it, he provides “adult supervision.” Barksdale, in his fatherly way, isn't afraid to tell them to go home, take a day off and get away on their vacations.

Growing pains strike

With the world so hectic inside, it's not surprising that the chaos trickles to the outside world. Phone calls haven't always been returned promptly, if at all, as press and industry analysts have learned.

The Netscape sales team also has been spreading itself too thin, says Rob Enderle, an industry analyst with Giga Information Group. At least six major companies have told him that the sales team either stopped returning calls or did not follow up on commitments they made.

One large corporate customer remembers a year ago being switched around five times before finding the proper contact. “I told them, you're going to lose some customers,” he said.

The company has been working to address such complaints. The customer support department, for instance, has swelled to 225 workers, more than 10 times last December's staffing level, said Mike Homer, Netscape's vice president of marketing.

As other departments add employees, phone calls are getting returned quicker. Public relations, for instance, is now up to 10 staffers, and though they claim they're just as busy, the extra staff undoubtedly helps.

“At the speed we're growing, I don't know that it would ever feel like it's really enough,” said Rosanne Siino, Netscape's director of corporate communications. ■

A BRIEF HISTORY OF NETSCAPE

April 1994
Company incorporated

December 1994
First Navigator Web browser, Commerce Server and Communications Server released

January 1995
Jim Barksdale hired as president and CEO

August 1995
Initial public offering of 5 million shares of common stock. Price: $28 a share

November 1995
Completion of acquisition of Collabra Software

December 1995
Stock hits high of $174 (later adjusted to $87 after stock split in January 1996)

February 1996
Released Netscape Navigator 2.0

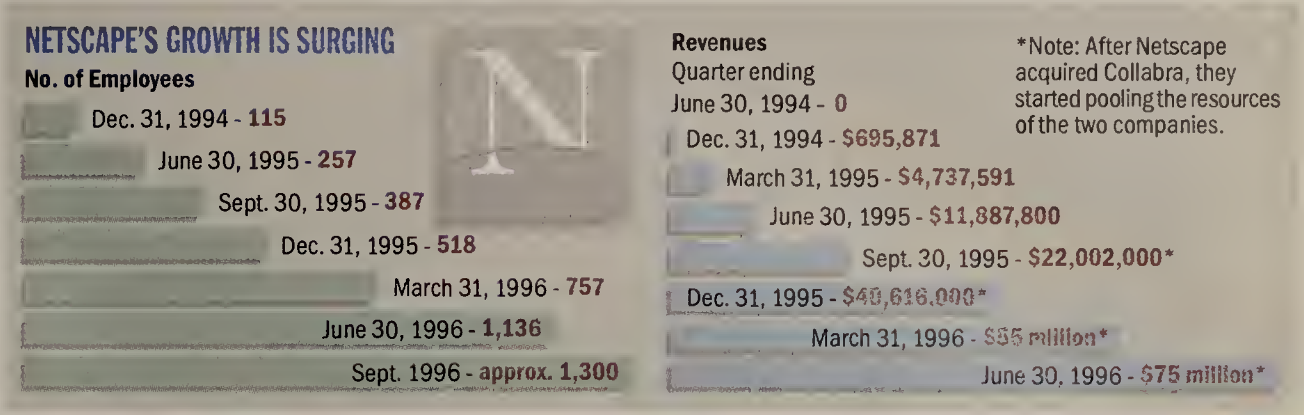
March 1996
Introduced SuiteSpot server product line

April 1996
Acquired InSoft, maker of communications and collaborative multimedia software

April 1996
Acquired Paper Software, provider of distributed 3D graphics

July 1996
Announced Netscape ONE (open network environment) for network-centric application development

August 1996
Released Navigator 3.0 client



Can Netscape cope with its growth?

Now that Netscape Communications Corp. has been put on a pedestal for its role in the Web market's success, plenty of people are only too happy to try knocking the company off.

But interviews with a cross section of the industry revealed a wide range of opinions on how well Netscape will fare as it tries to handle its own growth and an onslaught of competitors.

Bruce D. Smith, an analyst at Merrill Lynch & Company, Inc., a brokerage firm in New York, is among those who thinks the road ahead will be a rough one for Netscape.

“They're trying to out-innovate and out-market Microsoft,” he said. “It's almost impossible for anyone to out-market Microsoft.”

In order to survive, Netscape must work hard to partner with “companies that really count,” Smith added.

Analysts said Netscape also will need to keep growing at it current pace in order to survive in the explosive Internet marketplace.

“There's room for [Netscape and other companies] to be highly successful,” said Jim Breyer, a managing partner at Accel Partners, a venture capital firm in San Francisco. There does not have to be a winner take all.”

If Netscape's all-star management team can keep the company focused on intranet client/server computing, he said, the company has a shot at becoming a $1 billion organization five years from now.

Netscape has a shot as long as it continues to reinvest in the company, rather than worry about profits, observers said. A typical high-tech software company might allot 20% to 30% of its operating expenses to sales and marketing, and 10% to 15% to research and development. In 1995, Netscape's figures were 51% and 32%, respectively.

“If you are actually spending traditional amounts, you're going to miss the boat. You will not be able to exploit the unprecedented opportunity that the Internet has offered,” said Daniel Rimer, an Internet analyst with Hambrecht & Quist, an investment banking firm in San Francisco.

Some customers expressed reservations about making long-term commitments to Netscape, in view of the changing marketplace.

“I don't want to put all my eggs in the Netscape basket right now,” said Joe Butel, south unit technology manager at William M. Mercer, a human resources consulting firm that runs Netscape servers and uses Microsoft browsers. “I don't know what will happen to Netscape. They'll be here, but if you don't have market share, you're not getting the income. If you don't have the income, you can't do your R&D. You can't keep pace.”

—*Carol Sliwa*

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USPS 735-730

Of greeting cards, broken laptops and disgruntled users

Welcome to the Gibbs Institute of Optimized Planar Cellulose-based Communications Technology (greeting cards). Our Sympathy Division just came up with a verse that we believe should go down great in IT circles:

Your computer is dead
And it was so alive,
You shouldn't have installed
*Win95.**

So, what else is sympathy needed for? Laptop owners, for one.

I bought a Texas Instruments Extensa 455 last year, and I'm kind of irritated.

The machine runs mainly OK. It has a 75-MHz Pentium, an acceptable weight, an OK screen for the price and comes with Windows 95 ready to run... well, jog. More than one Type II PC Card socket would have been nice, but I can live with that.

Mark Gibbs

The details really drive me nuts: The floppy door dust cover that collapsed into the drive — irritating but repairable. The port replicator that required Herculean strength to disconnect — no real problem other than the broken nail. The little rubber feet on the fold-down props that fell off within two days — again irritating, but I can ignore that.

But what really, really, really bugged me were two crucial systems: the pointing device — a touchpad — and the battery management system.

At first, I rarely used the touchpad; I just plugged in a mouse and everything was fine. But when I eventually started using it, I found that when typing, the cursor would randomly jump up the screen!

Was it my thumbs brushing the touchpad? Nope. Was it a software bug? Could be. Or maybe a hardware problem — say, static buildup? I have no idea.

But even more annoying, the battery monitor didn't work. For the Extensa, this is pretty important as it doesn't have the greatest battery life on the market.

Sure, the Extensa could detect that it was running out of power and do an automatic save to disk without warning (that became routine on flights for me), but it seemed odd that I could never get the power monitor to work.

I bought a Texas Instruments Extensa 455 last year, and I'm kind of irritated.

As I make my living by rushing around, it was a long time (about six months) before I got around to trying to find out why the battery monitor and touchpad were as they were. Or rather weren't.

Turns out that the power monitor never did work! I finally called TI earlier this year and spoke to someone in press relations. They admitted (quite cheerfully, I thought) that the power monitor problem was a design flaw. Oh, that touchpad thing? Yeah, they'd heard that there was some kind of problem there but had no idea about it.

I left my name, asking to be contacted by someone about the solution to these problems and... nothing.

What ever happened to caring about your customers? This is a big issue. I'd sent in my registration card, and if that got lost, my friends at CompUSA** had the sales details. TI, if they were going to address this problem, could have found me (and everyone else with one of these lemons). I guess it doesn't matter enough to them.

So our Sympathy Division has designed a card for vendors to give out. It reads:

We're sorry that your computer
Behaves kinda funny,
But we really don't care
'Cause we've got your money.

*We have no idea who really wrote that verse. If you know, drop us a line.

** Oh, in case you read my column a few weeks ago where I discussed CompUSA's deficiencies and you've wondered what their response was, I never heard from them. I guess they really care, too.

Gibbs needs a new laptop. Horror stories, complaints and suggestions, please. Lay it on him at mgibbs@gibbs.com or call (800) 622-1108, Ext. 504. Next week, the horror of Interop.

Sex, lies and 56K modems will always get you into trouble

The NetWorld+Interop trade show here last week was evermore the predictable array of sexy technology being hawked by sexy booth babes, most of whom wouldn't know an ATM module if it bit them on their overexposed gams. Seeking a way to regain my puritanical concentration, I downshifted from the gorgeous display of fast technology to a topic likely to throttle any improper urge: 56K bit/sec modems.

Dave Buerger

Modems may be boring, but they are a key workhorse in every organization's communications setup. Getting faster throughput is crucial if you want to cut workers' wait times and telecommunications bills. Maybe that's why the possibility of doubling the average speed of analog modems has grabbed everyone's attention. Best of all, the idea is supposed to work on the public switched telephone network (PSTN).

Just plug in and rip. No fuss.

But after grilling several modem and chip vendors, my sense is that most users will probably find 56K bit/sec modems to be a disappointing marketing gimmick, at least for a few more years.

Modems are an essential workhorse in every organization's communications setup.

For all the hoopla, I've rarely seen vendors so reticent to detail the technical basis for their pitch. Some acted more confused about technical issues than I was. Perhaps they *wanted* to confuse the issues, a sure tip-off to a marketing play.

For example, I wondered out loud how this new technology would avoid violating Shannon's Law, which limits data transmission over voice-grade 30db telephone lines to about 30K bit/sec. The promise suddenly dimmed.

Vendor: Actually, no. You can't get 56K transmissions between two of these modems unless one of them is linked to an ISP or central office via a digital line.

Dave: So in that case, both modems would transmit and receive 56K data flows?

Vendor: Actually, no. Data would flow at 56K to the modem linked over a dial-up analog line, but that modem's uplink speed would be about 28K.

Dave: Are the modems transmitting data at 56K, or is this just another combination of 28K transmission technology with fancy compression, simulating a 56K data flow?

Mike Henderson, marketing director of network access products at Rockwell Semiconductor Systems, said compression is not used to achieve 56K bit/sec speeds. Other vendors would not discuss the compression angle. Compression really is just a cheap trick that works best with plain text data. Corporate intranets usually compress and encrypt files before wide-area transmission. Compressing a previously shrunk file simply makes it bigger and results in no speed "increase."

Besides, fast analog modems using V.42 technology rarely work at top speed. Experts say the last copper-based mile of the PSTN is too noisy, especially if wire passes near a noise source such as a motor.

Motorola, Inc., another vendor developing this technology, was cautious about results. "We think an achievable goal is to hit 48K to 56K bit/sec about half the time," said Bill Heinbach, manager of product development at Motorola's Information Systems Group. Heinbach said some vendors would take shortcuts and hit top speeds only 10% of the time. Rockwell expects to hit top speeds 90% of the time.

U.S. Robotics was rumored to be developing its own 56K bit/sec technology but refused to comment. Its stock jumped more than $10 based on that rumor. Stock gains are about the only near-term benefit users will see. The 56K bit/sec standard will take at least two years to crawl through the International Telecommunication Union. Meanwhile, incompatible modems will be the norm, just like the V.Fast fiasco in recent years. Yuck.

The moral I learned at Interop is that sexy technology will always cause trouble, even if it's just a modem.

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.

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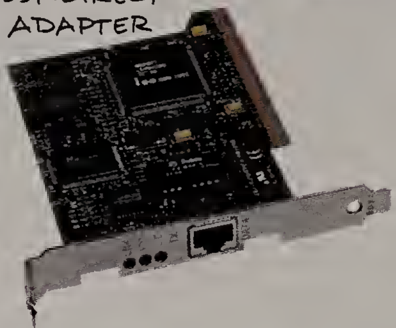

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Boston, MA	November 6–7
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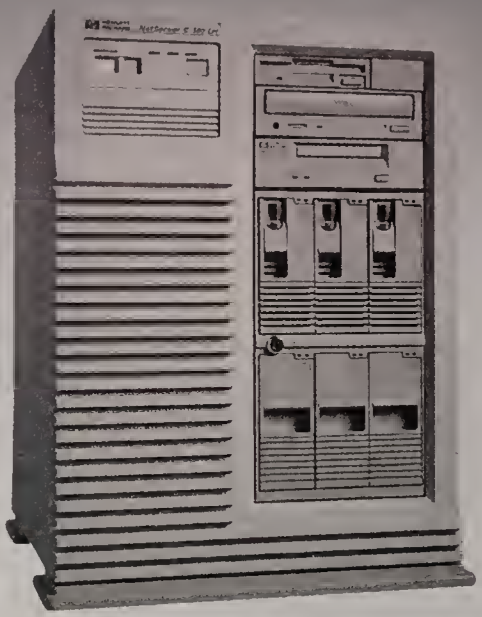

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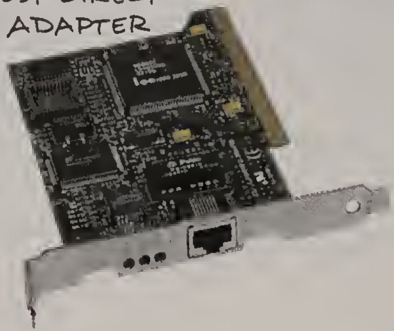

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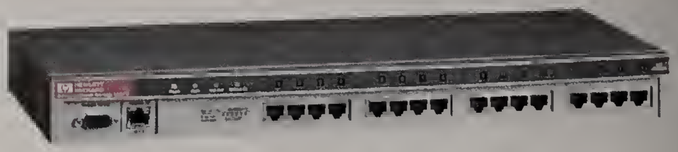

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